

# ***VES-1000 Series***

## ***VDSL-Ethernet Switches***

May 2002

Version 3.40

### ***Hardware Installation Guide***

# **ZyXEL**

TOTAL INTERNET ACCESS SOLUTION

# Copyright

## **VES-1000 Series of VDSL-Ethernet Switches**

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# Preface

Congratulations on your purchase from the VES-1000 Series of VDSL-Ethernet Switches.

This guide shows you how to set up the hardware for your VES-1000 Series Switch.

## About VDSL

VDSL (Very high bit rate Digital Subscriber Line) is one type of DSL with very high data rates. The service can be asymmetrical or symmetrical and can be used on the same wire as the POTS (Plain Old Telephone Service) network and ISDN.

## About the VES-1000 Series

The VES-1000 Series of VDSL-Ethernet Switches delivers high-performance broadband access at low cost to multi-tenant unit (MTU) buildings (hotels, motels, resorts, residential multi-dwelling units, office buildings, university campuses, etc.) and public facilities, such as convention centers, airports, plazas, and train stations. It attains speeds ranging from 1.56 Mbps to 16.67 Mbps upstream and 4.17 Mbps to 16.67 Mbps downstream at distances of up to 1.5 Km (5,000 feet) delivered over ordinary telephone lines.

There are currently two models in the VES-1000 Series of Ethernet Switches. The compact VES-1008 (one rack-unit (1U) high) can be mounted on a wall or placed on a rack. It has built-in voice-signal splitters for added system stability. In addition to remote management capability, a console port is used for local management. This 8-port switch is equipped with VLAN (Virtual LAN) capability that can isolate each port. You can connect up to 8 subscriber devices such as VDSL converters to this switch (ports 1 to 8). The VES-1012 extends on the flexibility of the VES-1008 as it provides 12 ports that allow for the connection of up to 12 individual subscribers.

This hardware installation guide caters for both models.

## Syntax Conventions

“Enter” means for you to type one or more characters and press the carriage return. “Select” or “Choose” means for you to select one from the predefined choices.

For brevity’s sake, we will use “e.g.” as shorthand for “for instance”, and “i.e.” as shorthand for “that is” or “in other words” throughout this manual.

Unless specified, images of the VES-1012 are used throughout this document. The VES-1008 has 8 available Ethernet ports however the images used in this User’s Guide show the 12 available ports that are featured on the VES-1012. Images that directly relate to the VES-1008 are used when referring to the key differences between the two models.

## Related Documentation

### User’s Guide

The User’s Guide explains firmware setup, management and maintenance procedures.

### ZyXEL Web Site

Please refer to [www.zyxel.com](http://www.zyxel.com) for an online glossary of networking terms and additional support documentation.



# Chapter 1

## VES-1000 Series Switch Applications

*This chapter describes the applications and basic operating environment for the VES Ethernet Switches.*

### 1.1 Applications

The VES-1008 supports 8 VDSL ports as well as a combined USER/CO Telco connector. Expanding on this flexibility, the VES-1012 features 12 VDSL ports as well as separate CO and USER Telco-50 connectors. The applications and operating environment (and associated diagrams) presented in this chapter primarily focus on the VES-1012; however, they are equally applicable for the VES-1008.

The following are typical applications for the VES-1000 Series of switches:

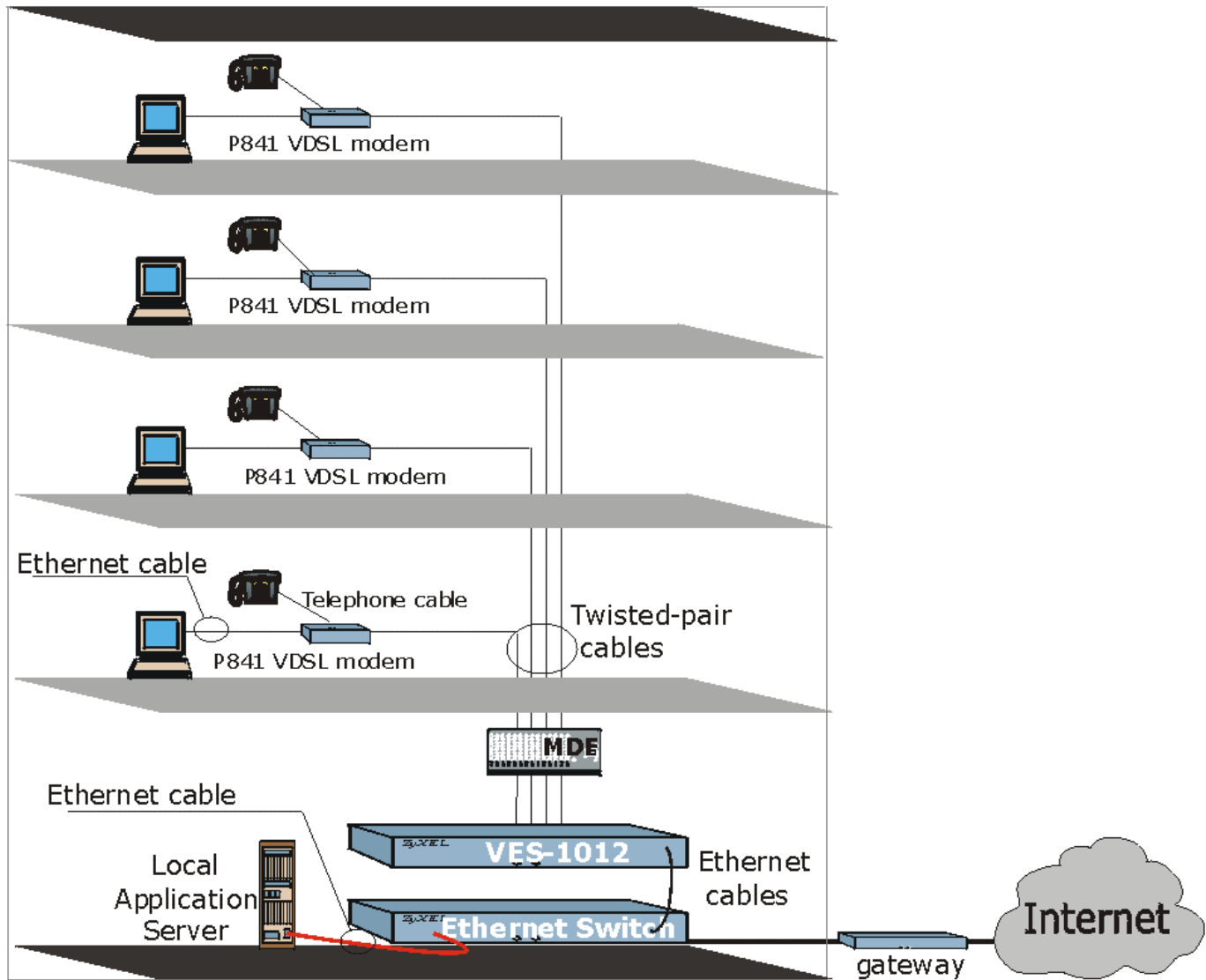
1. Multiple Tenant Unit (MTU)
2. Enterprise
3. Campus

#### 1.1.1 MTU Application

The following figure depicts a typical application for a VDSL-Ethernet Switch in a large residential building, or Multiple Tenant Unit (MTU), that leverages existing phone line wiring to provide Internet access to all tenants.

A tenant connects a computer to the phone line in a unit using a VDSL modem. The other end of the phone line is connected to a port on a VES-1000 Series switch. The VES-1000 Series switch aggregates the traffic from the tenants to the Ethernet port and forwards it to a router or switch. The router (or switch) then routes the traffic further to the Internet.

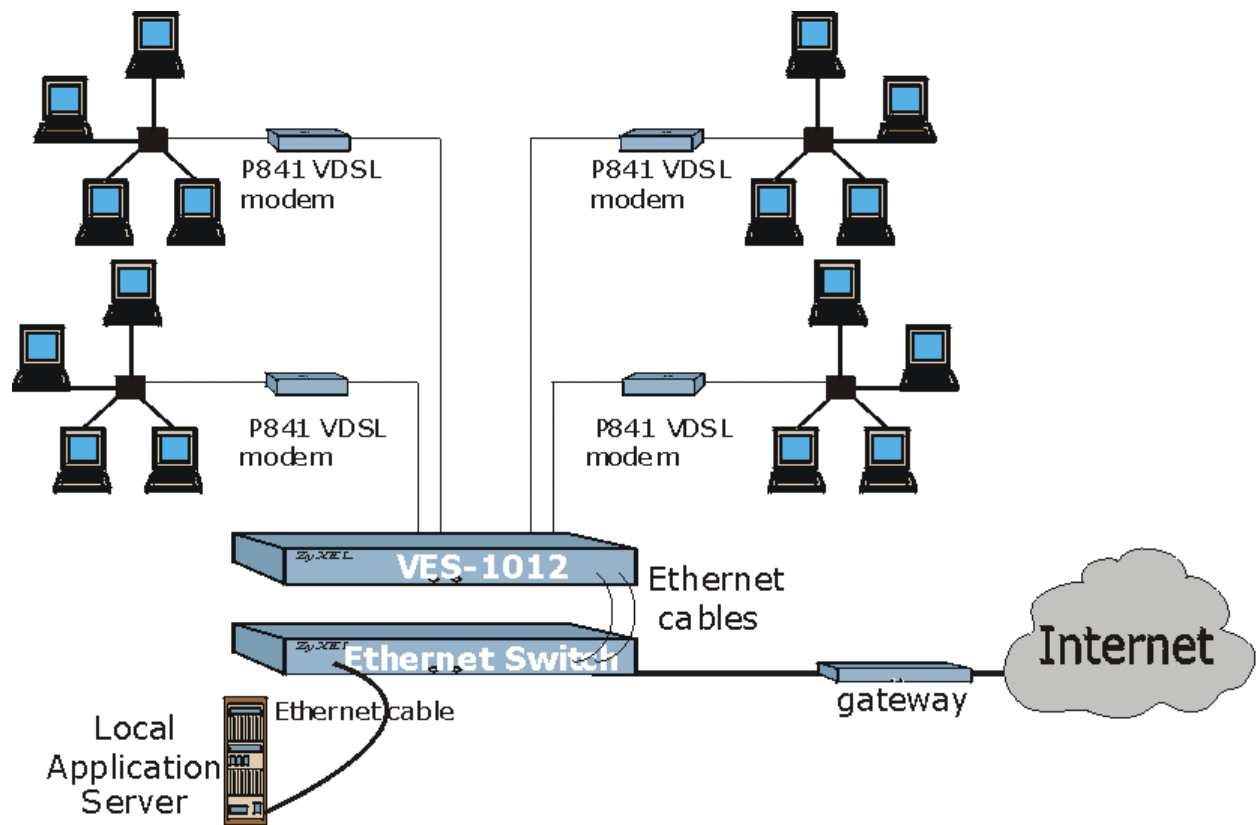
## Multiple Tenant Unit (MTU)



**Figure 1-1 Building Deployment Example Using a VES-1012**

### 1.1.2 Enterprise Application

The VES-1000 Series of switches can also be used in enterprises to multiplex employee traffic to the Internet.



**Figure 1-2 Enterprise Application Using a VES-1012**

### 1.1.3 Campus Applications

Independent networks can also have traffic multiplexed to a gigabit switch or fiber ring using a VES-1000 Series switch.

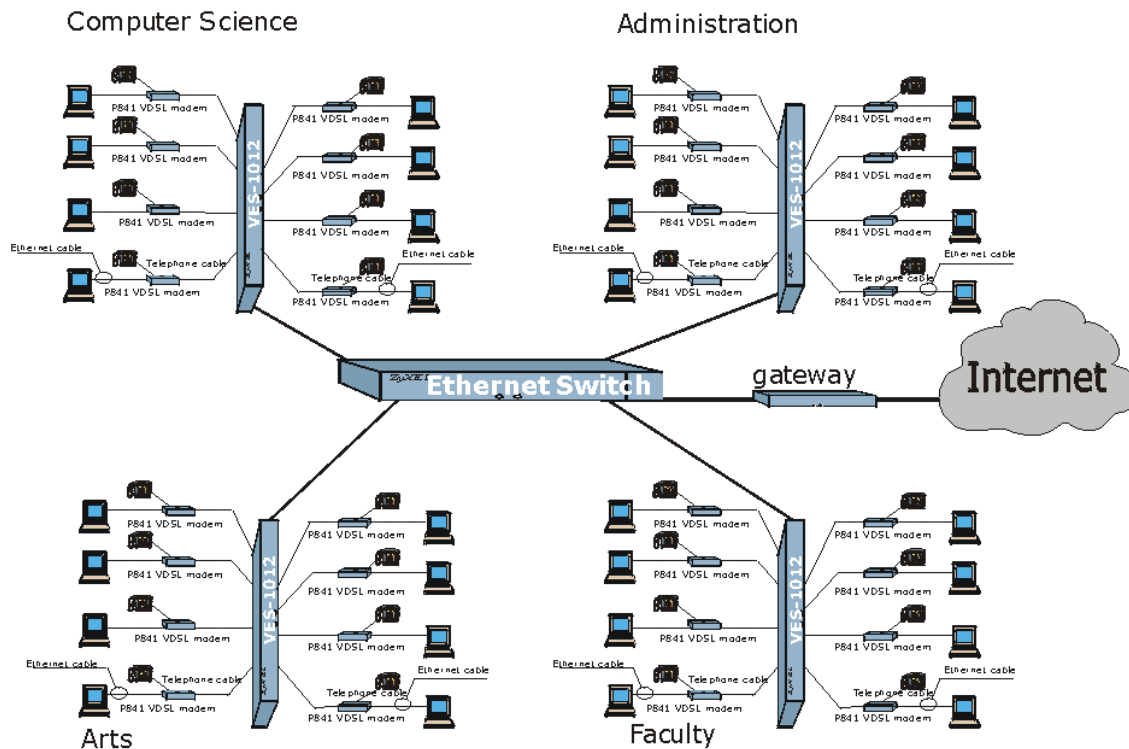


Figure 1-3 VES-1012 Example of a Campus Application Using a Gigabit switch

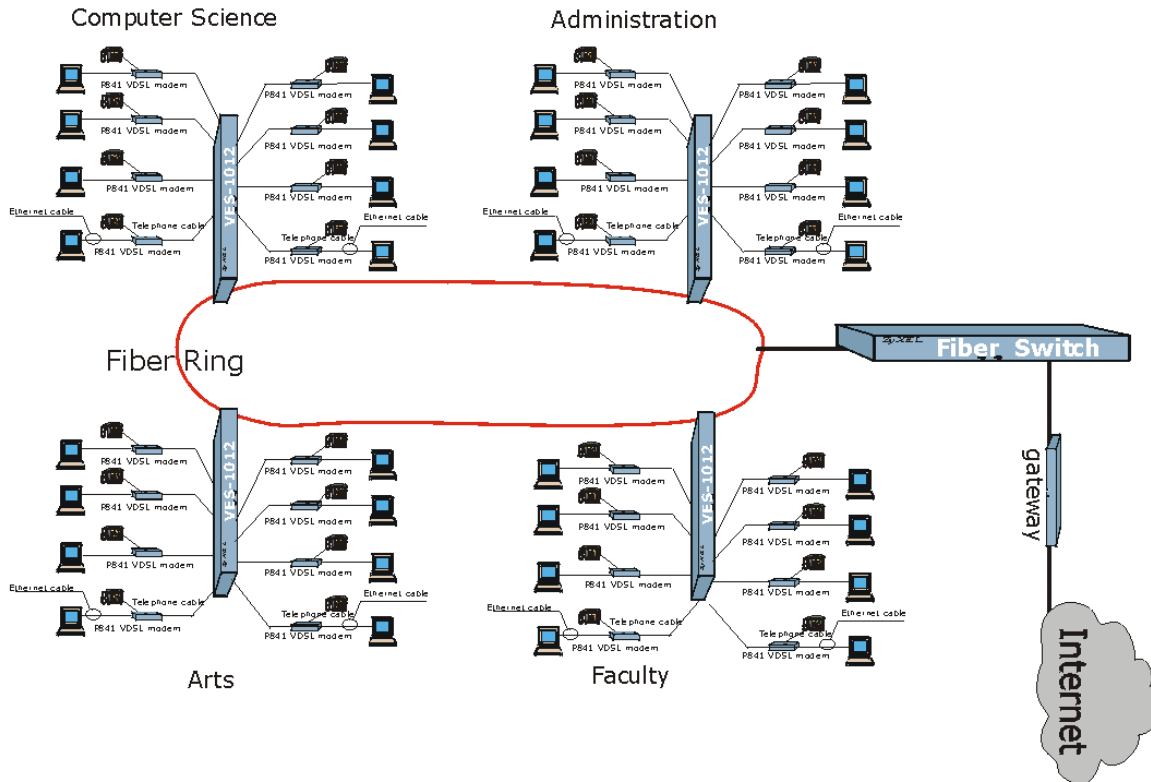


Figure 1-4 VES-1012 Example of Campus Application Using a Fiber Ring

# Chapter 2

## Hardware Installation

*This chapter shows you how to install the VES-1000 Series switch in a free-standing, rack-mounted or wall mounted scenario*

### 2.1 Operating Environment

The following is the recommended environment for both the VES-1008 and VES-1012 Ethernet switch.

- Operating Environment
  - Temperature: 0°C — 50°C
  - Humidity: 5% — 95%
- Storage Environment
  - Temperature: -25°C — 70°C
  - Humidity: 5% — 95%

---

**Refer also to the *Hardware Specification Appendix*.**

---

### 2.2 Installing the VES-1008

#### 2.2.1 Free-standing

Position the VES-1008 on a flat surface. Make certain that the unit has adequate ventilation.

#### 2.2.2 Rack-mounted

Please note that rack-mounted is optional for the VES-1008. As a result, rack-mounted accessories are not supplied.

- Two mounting brackets (optional).
- Eight M3 flat head screws (optional) and a #2 Philips screwdriver.
- Four M5 flat head screws and a #2 Philips screwdriver.

Before you proceed with mounting the VES-1000 Series switch in a rack, please take note of the following precautions:

**Precautions:**

- Make sure the rack will safely support the combined weight of all the equipment it contains.

- Make sure the position of the VES-1008 does not make the rack unstable or top-heavy. Take all necessary precautions to anchor the rack securely before installing the unit.

**Step 1.** Position a mounting bracket on one side of the VES-1008, lining up the four screw holes on the bracket with the screw holes on the side of the unit (Figure 2-1).

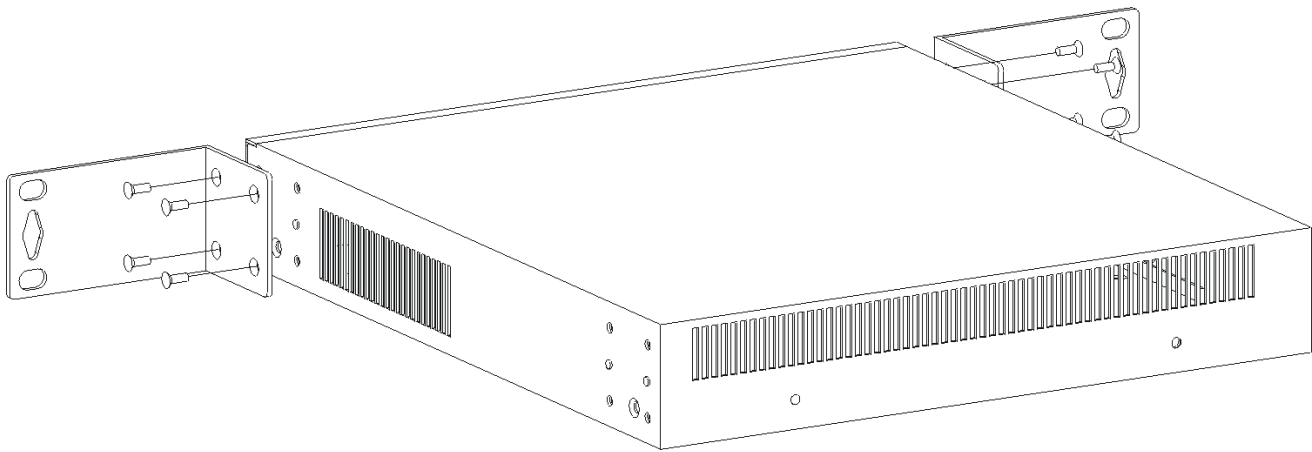
---

**Failure to use the proper screws may damage the unit.**

---

**Step 2.** Using a #2 Philips screwdriver, install the M3 flat head screws that came with the brackets through the mounting bracket holes into the VES-1008.

**Step 3.** Repeat Step 1 and Step 2 to install the second mounting bracket on the other side of the unit.



**Figure 2-1 Attaching the Mounting Brackets to the VES-1008**

You may now mount the VES-1008 in a rack.

**Step 1.** Position a mounting bracket (that is already attached to the VES-1008) on one side of the rack, lining up the two screw holes on the bracket with the screw holes on the side of the rack (Figure 2-2).

---

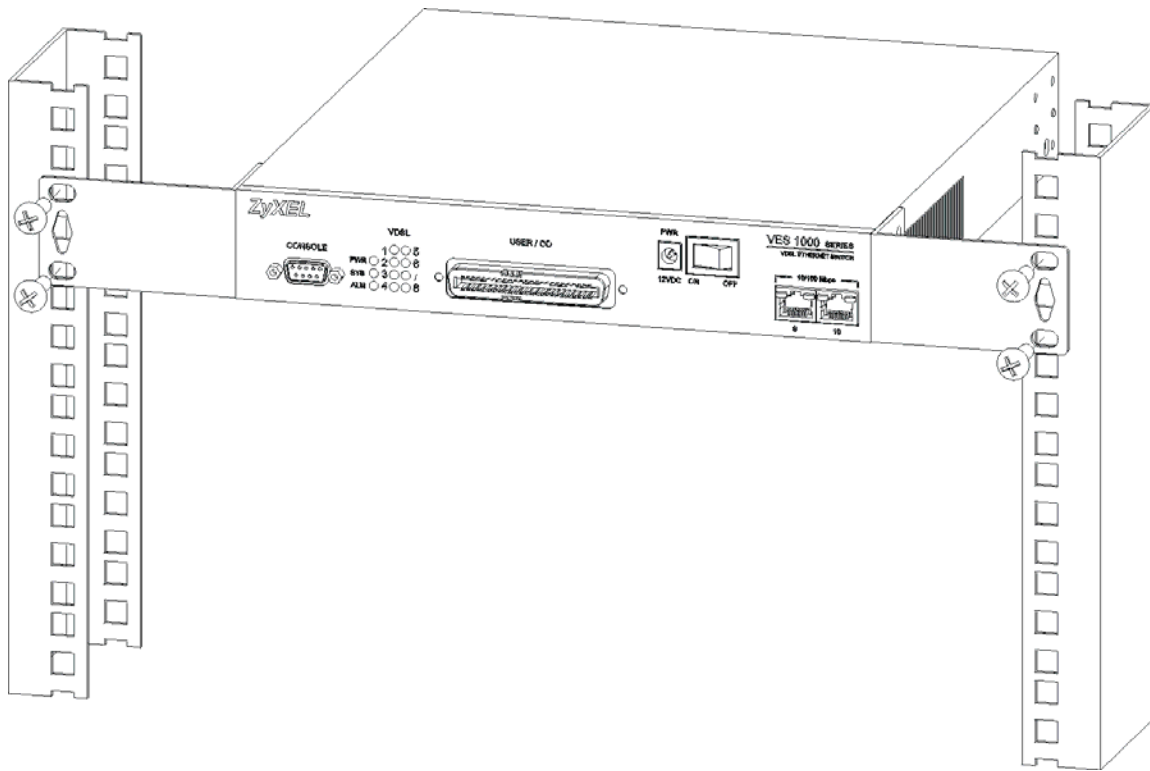
**Failure to use the proper screws may damage the unit.**

---

**Step 2.** Using a #2 Philips screwdriver, install the M5 flat head screws through the mounting bracket holes into the rack.

**Step 3.** Repeat Step 1 and Step 2 to attach the second mounting bracket on the other side of the rack.





**Figure 2-2 Mounting the VES-1008 in a Rack**

## 2.2.3 Wall Mounted

The VES-1008 is designed so that it can be mounted on a wall if the need arises. The following is needed in order to mount the VES-1008 on a wall:

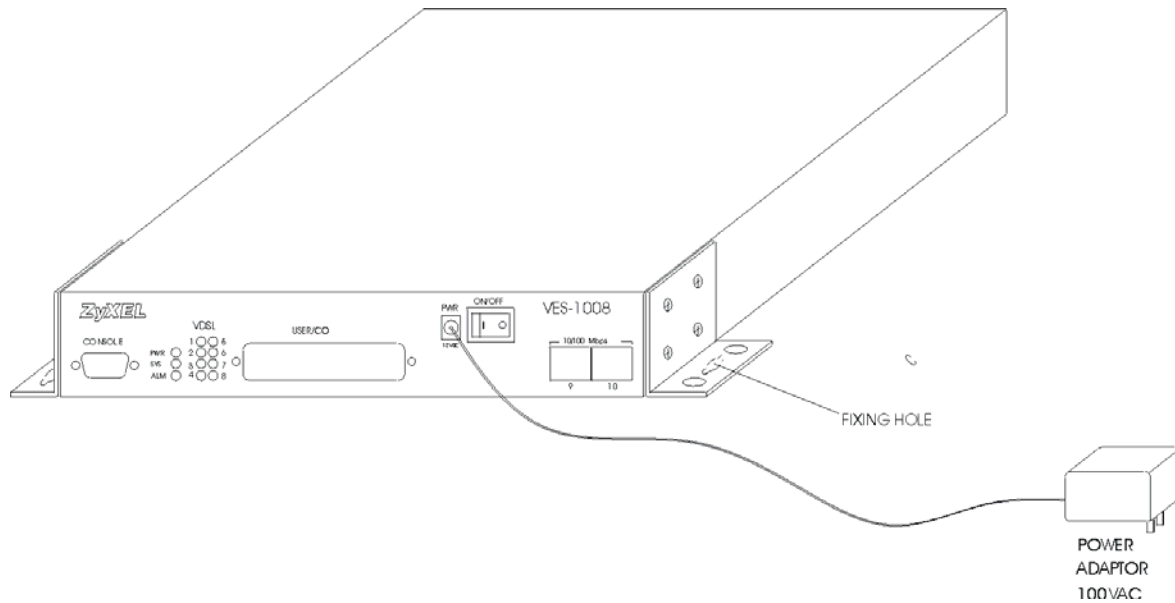
- Two mounting brackets (supplied).
- Eight M3 flat head screws (supplied) and a #2 Philips screwdriver.
- Four M5 flat head screws and a #2 Philips screwdriver.

Before you mount the VES-1008, please take note of the following precautions:

### Precautions

- Make certain that the intended position for the VES-1008 is strong enough to support the combined weight of the unit and the cables. It is strongly recommended that you position the VES-1008 so that the brackets are screwed into an upright beam, or stud, that is located within the wall.
- Make certain that when mounted, you will be able to safely insert the Telco-50 cable along with the power supply and then be able to safely monitor and observe the LEDs on the VES-1008.

**Step 1.** Position a mounting bracket on one side of the VES-1008, lining up the four screw holes on the bracket with the screw holes on the side of the unit (Figure 2-3).



**Figure 2-3 Attaching the Wall-mounting brackets to the VES-1008**

**Step 2.** Using a #2 Philips screwdriver, install the M3 flat head screws that came with the brackets through the mounting bracket holes into the VES-1008.

**Step 3.** Repeat Step 1 and Step 2 to install the second mounting bracket on the other side of the unit.

You may now mount the VES-1008 on the wall.

**Step 4.** Position the VES-1008 flat against the wall and screw the mounting brackets directly to the wall. Make certain that at least one of the mounting brackets is screwed into an upright beam, or stud, that is located within the wall. This ensures that the combined weight of the VES-1008 and the cables will not force any extra pressure on the actual wall.

**Step 5.** Plug the Telco-50 cable and the power supply into the unit and make certain that all cables are safely positioned and that you are able to easily monitor and observe the LEDs.

## 2.3 Installing the VES-1012

### 2.3.1 Free-standing

Position the VES-1012 on a flat surface. Make certain that nothing obstructs the cooling fans and that the unit has adequate ventilation.

### 2.3.2 Rack-mounted

- Two mounting brackets (supplied).

- Eight M3 flat head screws (supplied) and a #2 Philips screwdriver.
- Four M5 flat head screws and a #2 Philips screwdriver.

Before you proceed with mounting the VES-1000 Series switch in a rack, please take note of the following precautions:

**Precautions:**

- Make sure the rack will safely support the combined weight of all the equipment it contains.
- Make sure the position of the VES-1012 does not make the rack unstable or top-heavy. Take all necessary precautions to anchor the rack securely before installing the unit.

Step 1. Position a mounting bracket on one side of the VES-1012, lining up the four screw holes on the bracket with the screw holes on the side of the unit (Figure 2-4).

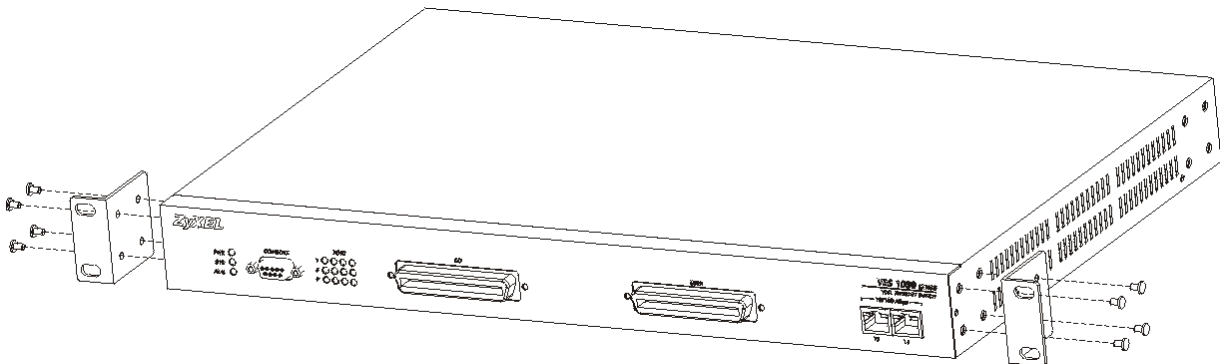
---

**Failure to use the proper screws may damage the unit.**

---

Step 2. Using a #2 Philips screwdriver, install the M3 flat head screws that came with the brackets through the mounting bracket holes into the VES-1012.

Step 3. Repeat Step 1 and Step 2 to install the second mounting bracket on the other side of the unit.



**Figure 2-4 Attaching the Mounting Brackets to the VES-1012**

You may now mount the VES-1012 in a rack.

**Step 4.** Position a mounting bracket (that is already attached to the VES-1012) on one side of the rack, lining up the two screw holes on the bracket with the screw holes on the side of the rack (Figure 2-5).

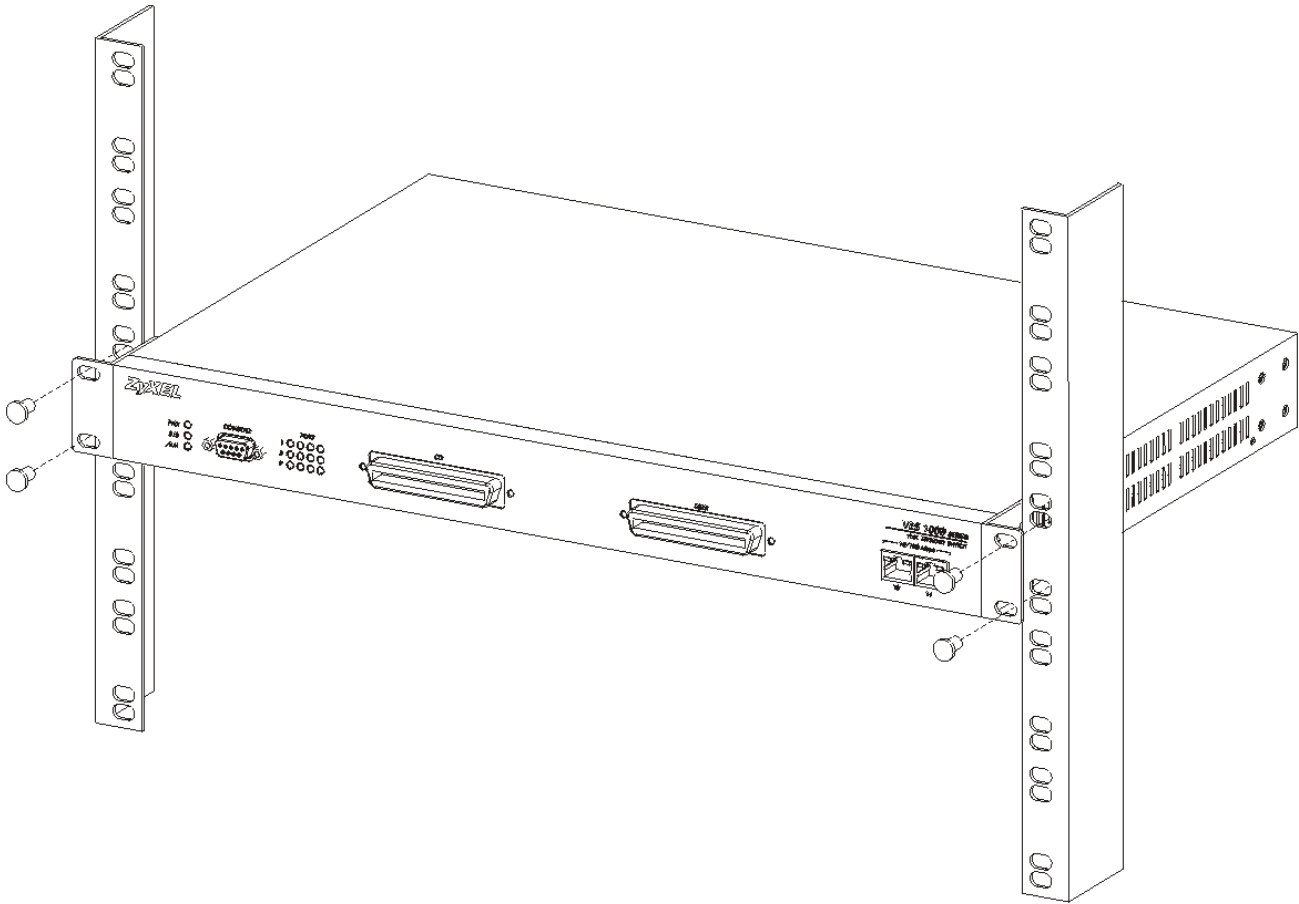
---

**Failure to use the proper screws may damage the unit.**

---

**Step 5.** Using a #2 Philips screwdriver, install the M5 flat head screws through the mounting bracket holes into the rack.

**Step 6.** Repeat Step 1 and Step 2 to attach the second mounting bracket on the other side of the rack.



**Figure 2-5 Mounting the VES-1012 in a Rack**

# Chapter 3

## Installation Scenarios

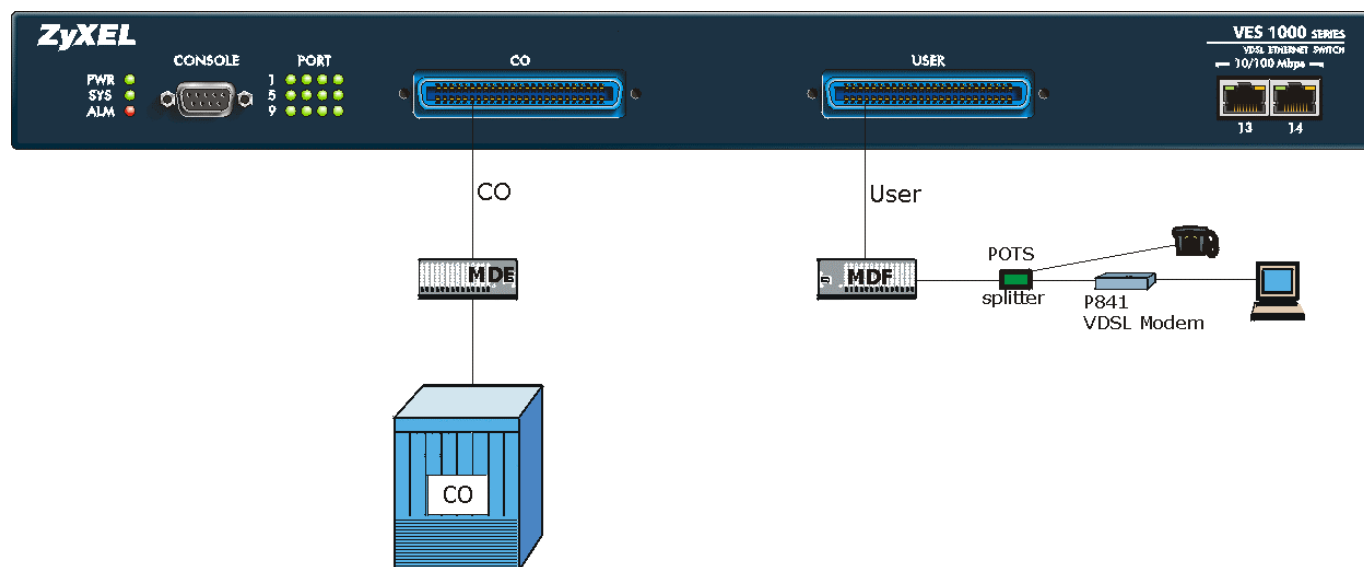
*This chapter details how to connect VDSL wiring to MDFs based on your existing telephone wiring infrastructure.*

### 3.1 Overview

Unless specified, images of the VES-1012 are used throughout this chapter. The VES-1008 has 8 VDSL ports as well as a combined USER/CO Telco connector; however, the VES-1012 features 12 VDSL ports as well as separate CO and USER Telco-50 connectors.

It should be noted that although the VES-1012 is shown in the following diagrams, the following scenarios can also apply to the VES-1008 - the primary difference is that a single Telco-50 cable is used for the combined USER/CO signal on the VES-1008. Installation instructions for the following scenarios are given for both the VES-1008 and the VES-1012.

Figure 3-1 gives an overview on a possible installation scenario for the VES-1012. Data and voice signals can coexist on the same telephone lines.



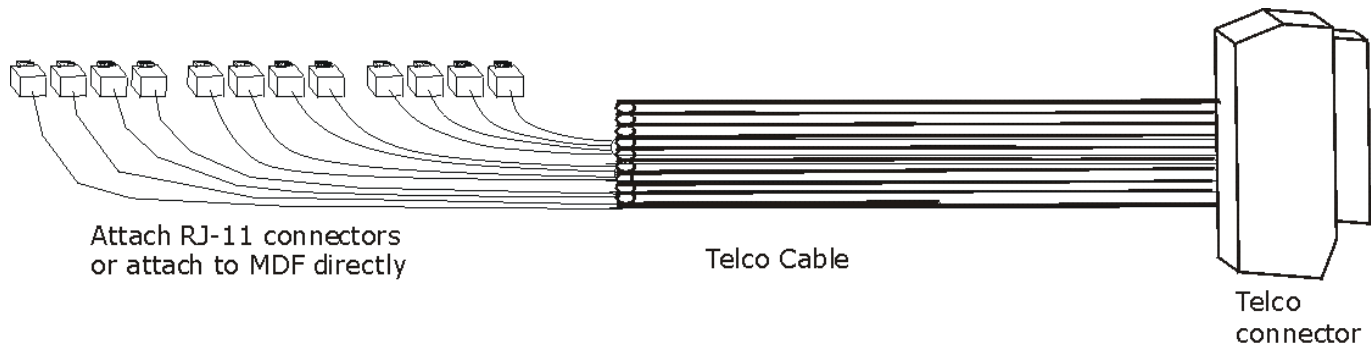
**Figure 3-1 Installation Overview for a VES-1012**

**You can also attach RJ-11 connectors to the Telco cable and connect directly to a P841 VDSL modem(s) or patch panel. This chapter discusses connections using MDFs.**

## 3.2 Telco Cables

Telco cables are used for data and voice applications with MDFs (Main Distribution Frame), patch panels and distribution boxes. They can also be used as extension cables. Telco cables are typically made up of 25 or 50 twisted-pair copper wires.

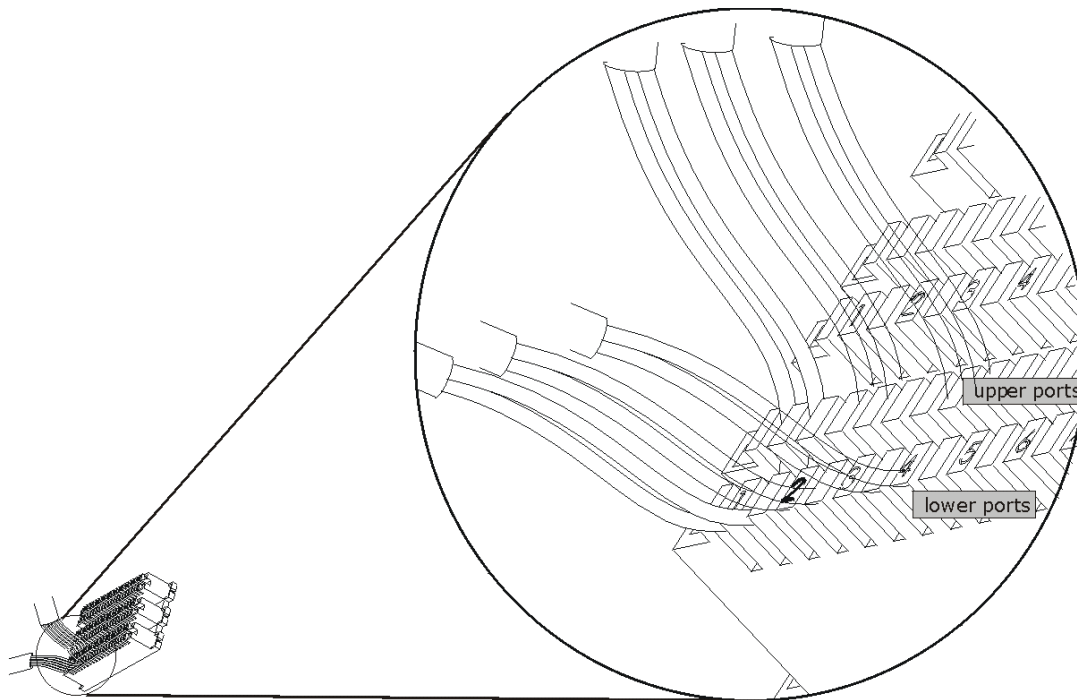
Connect a Telco connector to one end of the cable (see Diagram 5 for VES-1008 and Diagram 6 for VES-1012 in Appendix B for pin assignments) and connect the other end directly to an MDF; alternatively attach RJ-11 connectors and connect directly to VDSL modem(s).



**Figure 3-2 Telco Cable**

## 3.3 MDF (Main Distribution Frame)

An MDF is usually installed between end-users' equipment and the telephone company (CO) in a basement or telephone room. The MDF is the point of termination for the outside telephone company lines coming into a building and the telephone wiring in the building.



**Figure 3-3 MDF (Main Distribution Frame) Wiring**

Connect wiring to end-user equipment to the lower ports of an MDF and connect wiring from the telephone company to the upper ports of an MDF (see the previous figure).

Some MDFs have surge protection circuitry built in between the two banks; thus, do not connect telephone wires from the telephone company directly to your VES-1000 Series switch.

Use a punch-down tool to seat telephone lines into MDF blocks.

---

**Multiple upper and lower MDF port connections are shown as one line in the following figures.**

---

## 3.4 Typical Scenarios

Your existing telephone wiring usually depends on your region. We describe three typical installation scenarios here.

### 3.4.1 Installation Scenario A

You want to install the VES-1000 Series switch in an environment where there are no previously installed MDFs. There is no phone service and you want to install the VES-1000 Series switch for data-access only. No connection from the Telco-50 CO port is necessary.

You may connect using an MDF or attach RJ-11 connectors to the non-VES-1000 Series switch side of the Telco cable and then connect to a VDSL modem directly.

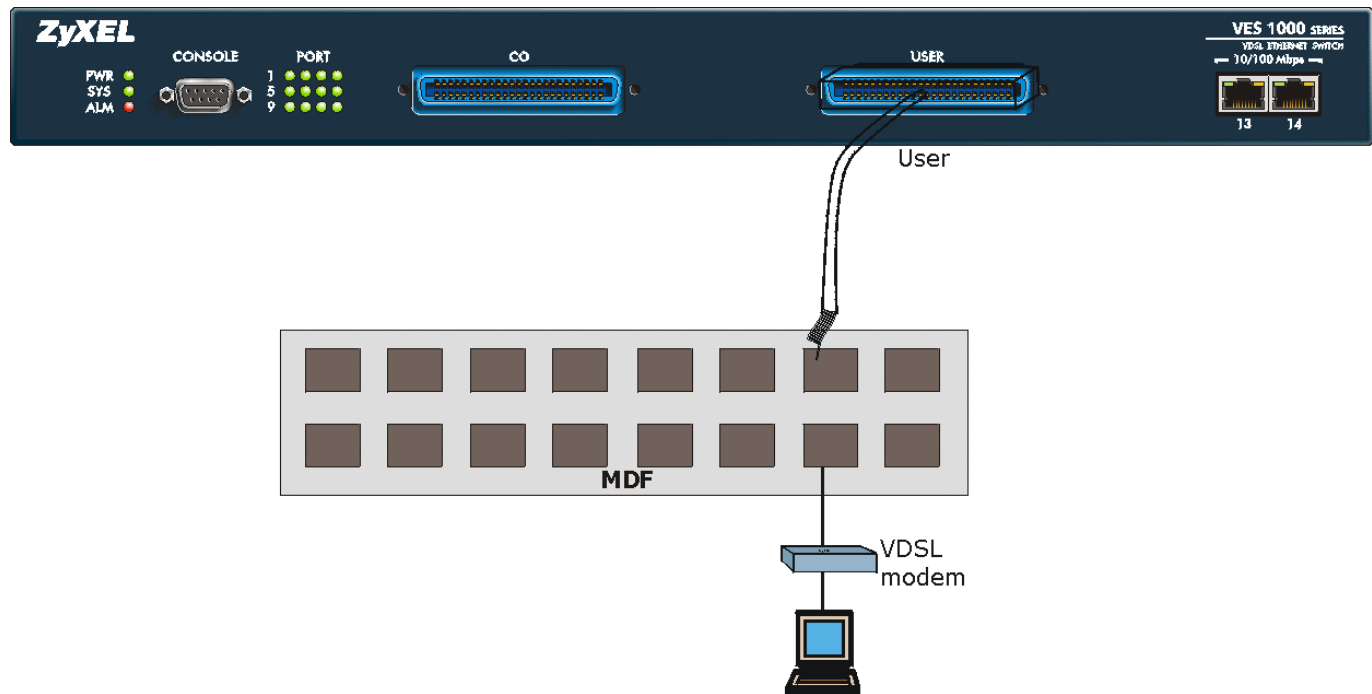


Figure 3-4 Installation Scenario A Using a VES-1012

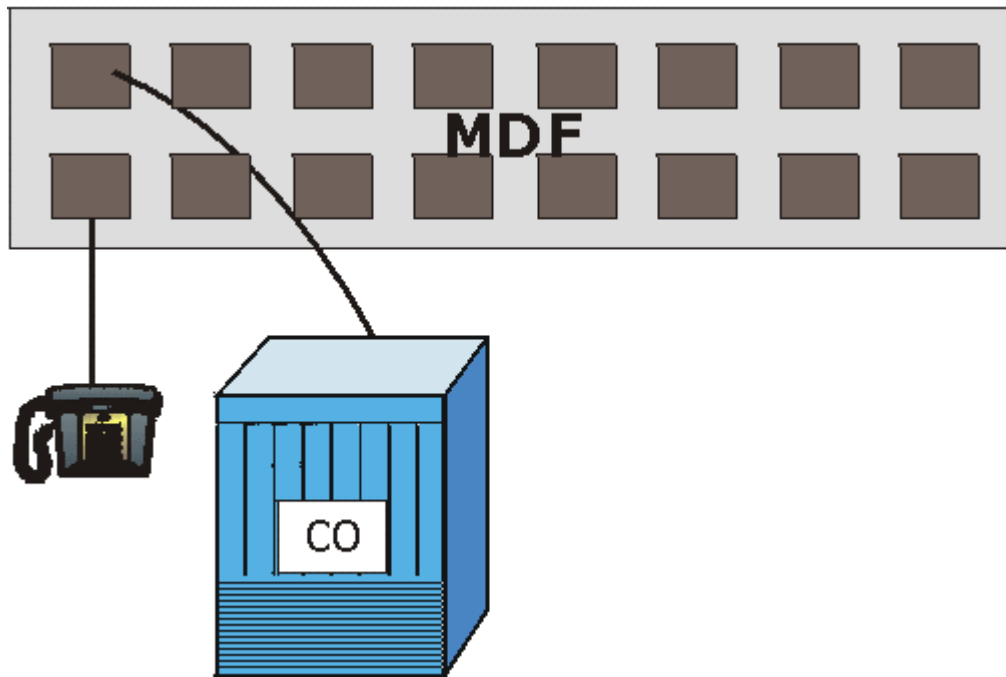
### Procedure To Connect To An MDF

- Step 1.** Follow the pin assignments shown in the *Appendix – Pin Assignments* to wire a Telco cable (not supplied in the package) to a Telco-50 connector (supplied).
- Step 2.** For the VES-1008 only, connect the Telco-50 connector end of the cable to the combined **USER/CO** Telco-50 port located on the front panel of the VES-1008.  
  
For the VES-1012 only, connect the Telco-50 connector end of the cable to the Telco-50 port labeled **USER** on the VES-1000 Series switch.
- Step 3.** Connect the wiring on the other side of the Telco-50 cable to the upper ports of the MDF using a punch-down tool.
- Step 4.** Connect the telephone wiring from each end-user's VDSL modem to the lower ports of the MDF.

### 3.4.2 Installation Scenario B

Phone service is available. There is one MDF from which end-users CO connections are made (see *next figure*).





**Figure 3-5 One MDF for End-user and CO Connections**

Please refer to the following figure for the connection schema.

- MDF 1 is the original MDF used for telephone connections only.
- MDF 2 is used for telephone connections only.
- MDF 3 is for VDSL service connections.

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**Change the wiring from MDF 1 to MDF 3 for telephone subscribers who want VDSL service.**

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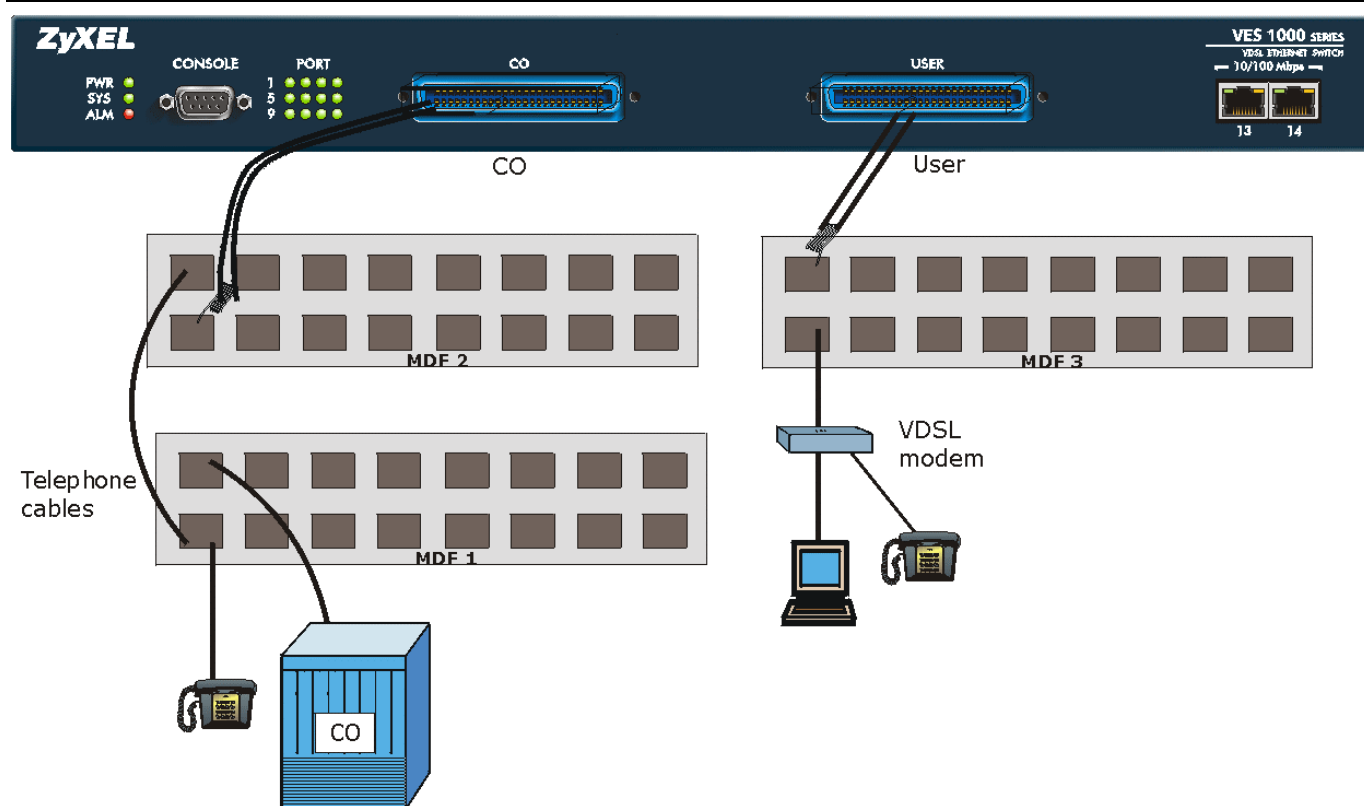


Figure 3-6 Installation Scenario B using VES-1012

## Procedure To Connect To MDFs

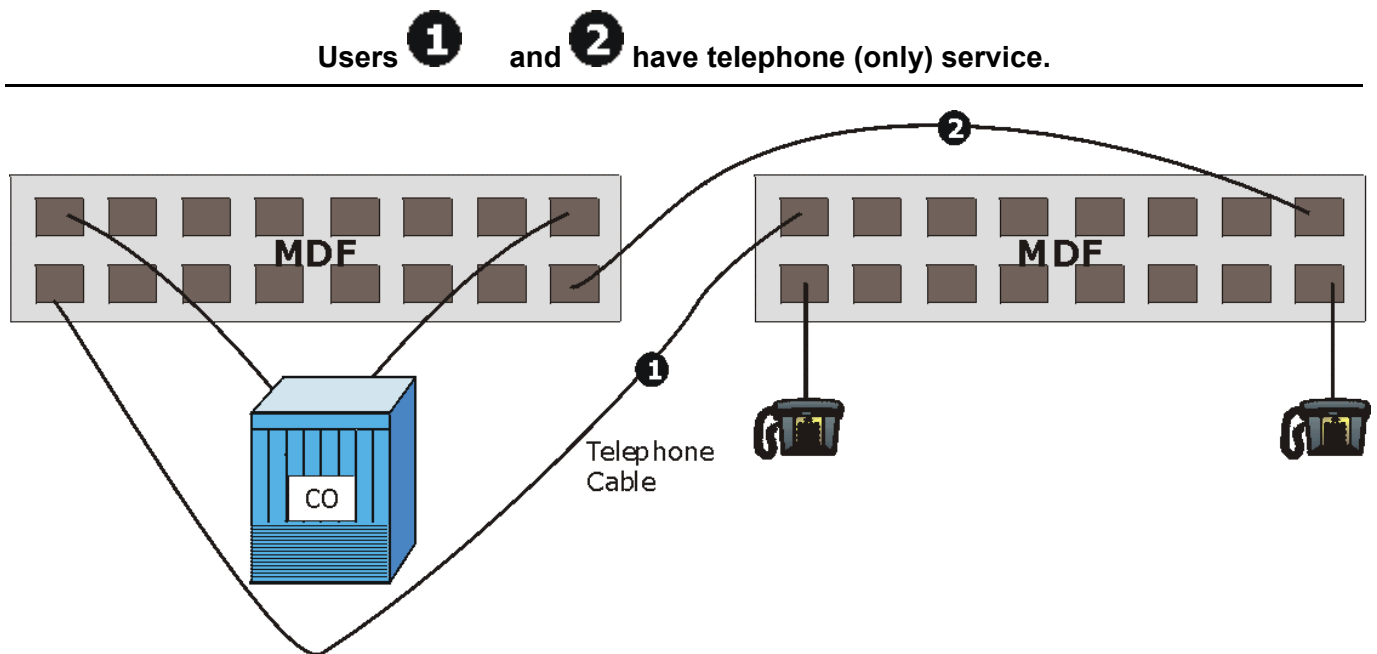
- Step 1.** Acquire two additional MDFs (MDF 2 and 3).
- Step 2.** Follow the pin assignments shown in the *Appendix – Pin Assignments* to configure a Telco-50 cable. The VES-1008 requires one cable (not supplied) and the VES-1012 requires two Telco cables (not supplied in the package) to two Telco-50 connectors.
- Step 3.** For the VES-1008 only, configure the Telco-50 cable to reflect the required phone and VDSL services. When configured, plug the connector end of the cable to the combined **USER/CO** Telco-50 port located on the front panel of the VES-1008.  
For the VES-1012 only, connect the Telco-50 connector end of the cable you want for VDSL service to the Telco-50 port labeled **USER** on the VES-1012 front panel.
- Step 4.** Connect the wiring on the other side of the Telco-50 cable to the upper ports of MDF 3 using a punch-down tool.
- Step 5.** Connect the telephone wiring from the end-user's VDSL modem(s) to the lower ports of MDF 3.
- Step 6.** For the VES-1012 only, connect the Telco-50 connector end of the cable you want for phone service to the Telco-50 port labeled **CO** on the VES-1012 front panel.
- Step 7.** Connect the wiring on the other side of the Telco-50 cable to the lower ports of MDF 2 using a punch-down tool.
- Step 8.** Connect the upper ports of MDF 2 to the lower ports of MDF 1 using regular telephone cables.
- Step 9.** Connect the upper ports of MDF 1 to the telephone company.

**Step 10.** Telephone subscribers only (that is, non-VDSL subscribers) retain connections to the lower ports of MDF 1.

**Step 11.** Change the wiring from MDF 1 to MDF 3 for telephone subscribers who want VDSL service.

### 3.4.3 Installation Scenario C

Phone service is also available but there are two MDFs; one for end-user telephone line connections and the other one for CO telephone line connections (Figure 3-7).



**Figure 3-7 Two Separate MDFs for End-user and CO Connections**

Please refer to *the following figure* for the VDSL connection schema.

- MDFs 1 and 2 are the two original MDFs.
- MDFs 3 and 4 are two additional MDFs you need.

**User ① still has telephone service only. User ② now has VDSL service also (see Figure 3-8).**

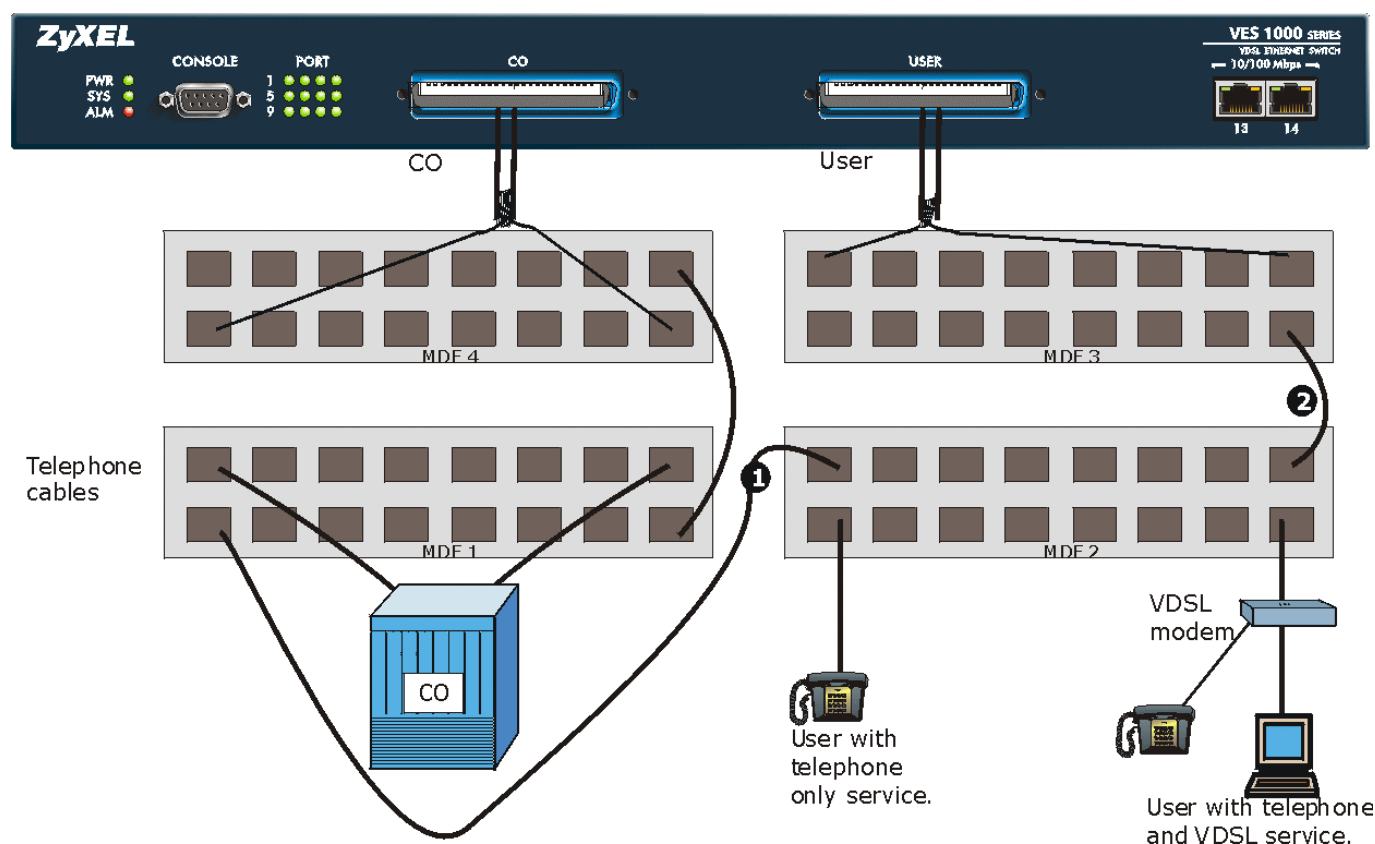


Figure 3-8 Installation Scenario C using the VES-1012

## Procedure To Connect To MDFs

- Step 1.** Acquire two additional MDFs (3 and 4).
- Step 2.** For the VES-1008 only, follow the pin assignments shown in *Diagram 5* to configure a cable for this installation.  
For the VES-1012 only, follow the pin assignments shown in the *Diagram 6* and *Diagram 7* to wire two Telco cables (not supplied in the package) to two Telco-50 connectors (supplied).
- Step 3.** For the VES-1008 only, when configured, connect the Telco-50 connector to the combined **USER/CO** Telco-50 port located on the front panel of the VES-1008.  
For the VES-1012 only, connect the Telco-50 connector end of the Telco cable you want for VDSL service to the Telco-50 port labeled **USER** on the VES-1012 front panel.
- Step 4.** Connect the wiring on the other side of the Telco-50 cable to the upper ports of MDF 3 using a punch-down tool.
- Step 5.** Connect the lower ports of MDF 3 to the upper ports of MDF 2 for those users that want VDSL service. (Users who want to telephone service only, retain the original connection from the top port of MDF 2 to the bottom port of MDF 1.)
- Step 6.** Connect the telephone wiring from the end-user's VDSL equipment to the lower ports of MDF 2.
- Step 7.** For the VES-1012 only, for voice service, connect the Telco-50 connector end of the Telco cable you want for voice service to the Telco-50 port labeled **CO** on the VES-1012 front panel.

- Step 8.** Connect the wiring on the other side of the Telco-50 cable to the lower ports of MDF 4 using a punch-down tool.
- Step 9.** Connect the top ports of MDF 4 to the bottom ports of MDF 1 using regular telephone cables.
- Step 10.** Connect the top ports of MDF 1 to the telephone company.



# Chapter 4

## Hardware Connections

*This chapter shows you how and where to make hardware connections.*

Before you make your hardware connections, make sure that your VES-1000 Series switch is safely and securely positioned.

### 4.1 Rear Panel Connections

#### 4.1.1 Power Cord

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**Make sure you are using the correct power source.**

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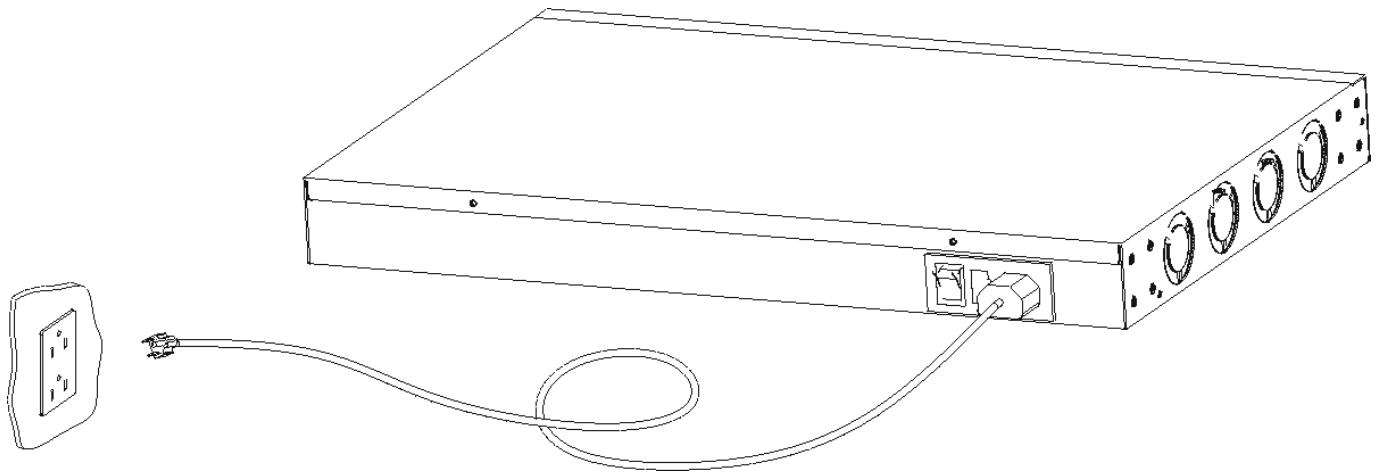
The following figure shows the rear panel of the VES-1012 only. The VES-1008 differs in that the 12-volt DC power socket is located on the front panel. There are no sockets or switches on the back panel of the VES-1008.



**Figure 4-1 The VES-1012 Rear Panel**

The VES-1008 has a 12-volt DC power socket located on the front panel. This allows for the convenient placing of the unit in locations where space may be a limitation. To connect the power to the unit, plug the round end of the plug on the supplied power adaptor into the power socket on the front panel. Connect the other end of the supplied power adaptor to a power outlet. Always use the ZyXEL supplied power adaptor as the VES-1008 may be damaged if third party power adaptors are used.

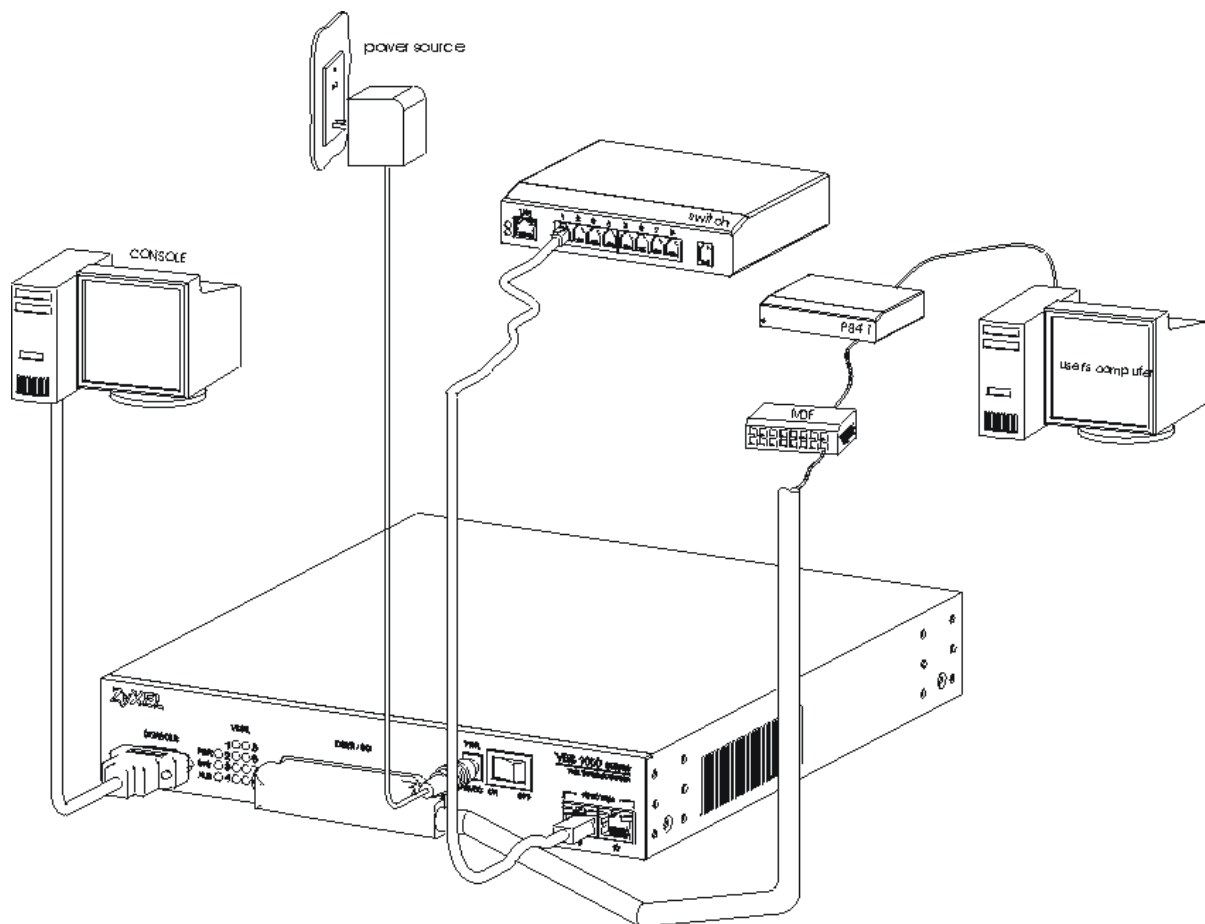
To connect the VES-1012 only, connect the female end of the power cord to the power receptacle on the rear panel of your VES-1012 (just to the right of the warning sticker) as seen in Figure 4-2. Connect the other end of the cord to a power outlet. Make sure that no objects obstruct the airflow of the fans (located on the side of the unit).



**Figure 4-2 Connecting the Power Cord to the VES-1012 and a Power Source**

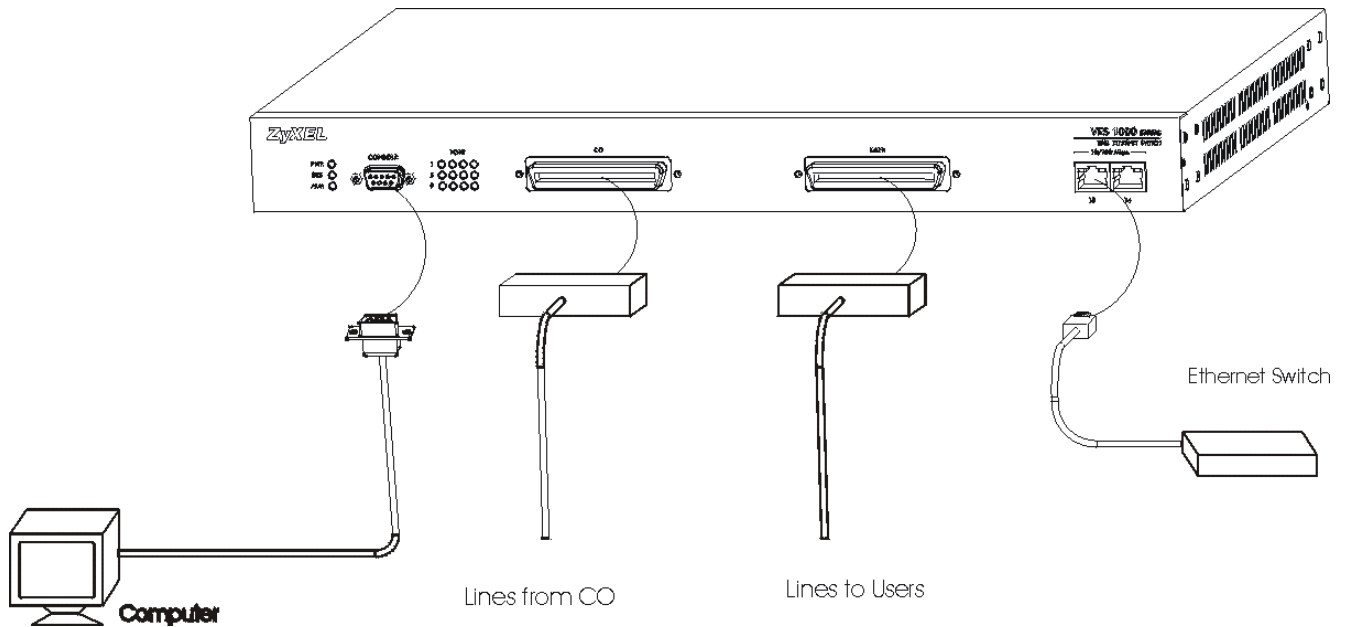
## 4.2 Front Panel Connections

The VES-1000 Series of Ethernet switches all feature the Console port, VDSL and WAN Ethernet switch connections on the front panel.



**Figure 4-3 VES-1008 Front Panel Connections Overview**

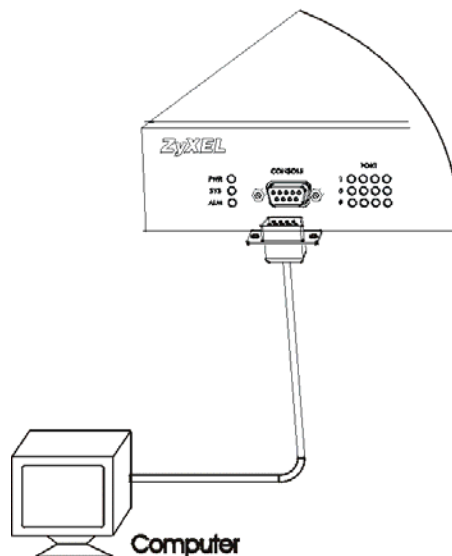




**Figure 4-4 VES-1012 Front Panel Connections Overview**

### 4.2.1 Console Port

For the initial configuration, you need to use terminal emulator software on a computer and connect it to the VES-1000 Series switch through the console port. Connect the male 9-pin end of the console cable to the console port of the VES-1000 Series switch. Connect the other end (either a female 25-pin or female 9-pin) to a serial port (COM1, COM2 or other COM port) of your computer. You can use an extension RS-232 cable if the enclosed one is too short. After the initial setup, you can modify the configuration remotely through a Telnet connection.



**Figure 4-5 Console Port Connection**

## 4.2.2 VDSL Ports Connections

The VES-1008 has a combined USER/CO Telco-50 connector and this is used for external POTS/ISDN and VDSL connections. Supplied with the VES-1008 is a cable that is designed to fit into the combined USER/CO connector and it is a requirement for the installer to configure the other end of the cable to suit their installation requirements.

The Phone Port pins (pins 1-8 and 26-33) connect to the Main Distribution Frame (MDF) that is usually located in the multi-tenant unit. Eight separate phone connections from different subscribers are available on the VES-1008 and each of their phone connections are required to be connected to its respective port on the MDF. The VDSL Port pins are used to connect the VES-1008 to the VDSL modems (for example, ZyXEL's Prestige 841). As with the phone port pins, each VDSL port requires 2 separate pins. Eight separate VDSL ports are available on the VES-1008 and each port is available to a separate user.

Diagram 5 details the pin assignments for the VES-1008 Phone and VDSL ports.

For the VES-1012 only, connect the lines from the user equipment (VDSL modems) to the **USER** port and the lines from the central office switch or PBX (Private Branch Exchange) to the **CO** port. Make sure that the **USER** line and the **CO** lines are not shorted on the MDF (Main Distribution Frame). Diagram 6 and Diagram 7 respectively show the Phone and VDSL ports on the VES-1012.

The line from the user carries both the VDSL and the voice signals. For each line, switches in the VES-1000 Series have a built-in splitter that separates the high frequency VDSL signal from the voice band signal and feeds the VDSL signal to the VES-1000 Series switch, while the voice band signal is diverted to the CO port.

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**See the previous chapter for different VDSL to MDF wiring scenarios.**

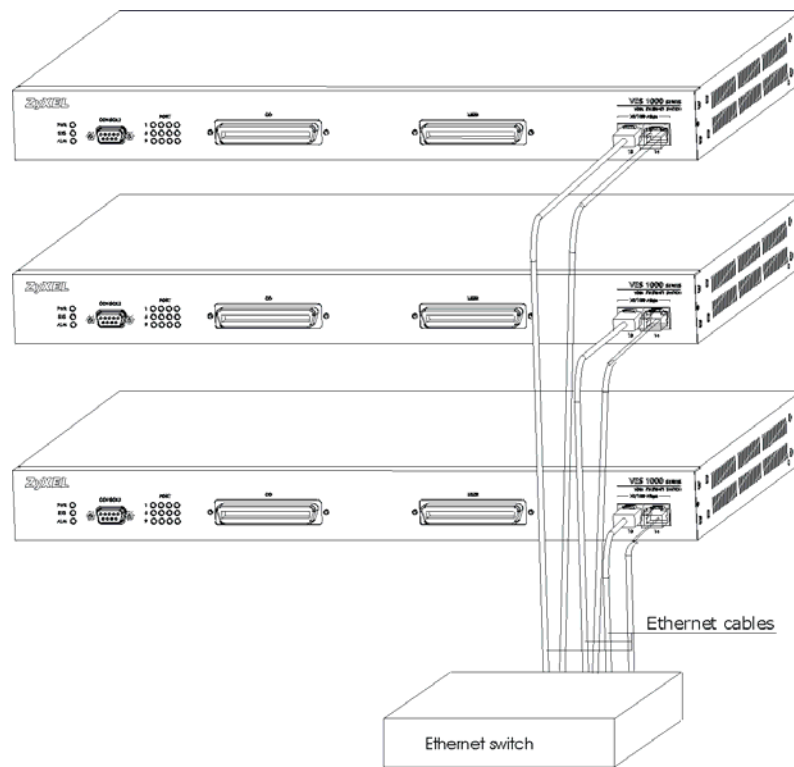
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## 4.2.3 WAN Port (Ethernet) Connections

For the VES-1008 only, connect ports 9 and 10 of the VES-1008 to a WAN Ethernet switch using straight-through Category 5 UTP (Unshielded Twisted Pair) cables with RJ-45 connectors. For the VES-1012, connect ports 13 and 14 to an Ethernet switch using straight-through Category 5 UTP (Unshielded Twisted Pair) cables with RJ-45 connectors.

You may stack the VES-1000 Series of Ethernet switches up to the number of ports available on the WAN switch.

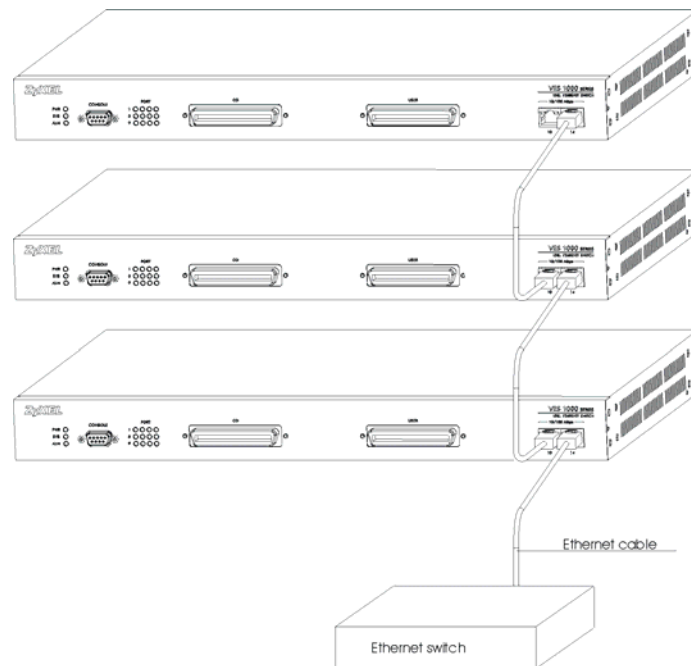
If you enable port trunking, make certain that the WAN switch also supports port trunking. See your *VES-1000 Series User's Guide* for more details.



**Figure 4-6 Stacking the VES-1012**

If the number of ports on the WAN switch is limited, it is possible to daisy-chain the VES-1000 Series of switches before connecting to the WAN switch. Use crossover cables between VES-1000 Series Switches and a straight-through cable (as described above) between VES-1000 Series Switches and an Ethernet switch.

You also need to change the default VLAN configuration – refer to the *VES-1000 Series User's Guide*.



**Figure 4-7 Daisy-chaining Connections**



# Chapter 5

## Turning On Your VES-1000 Series Switch

*This chapter discusses the fans and LEDs of the VES-1000 Series switch after you turn it on.*

### 5.1 Introduction

Before turning on your VES-1000 Series switch, make sure you:

- Have attached a computer to the VES-1000 Series switch serial port as explained previously.
- Can see the status LEDs on the front panel while you view the VT100 terminal emulator.

Push the power switch (located on the front panel of VES-1008 and on the back panel for the VES-1012) to the **ON** position. The VES-1000 Series switch will automatically run a self-test that takes approximately 20 seconds. The SYS LED will remain on if your VES-1000 Series switch has started normally.

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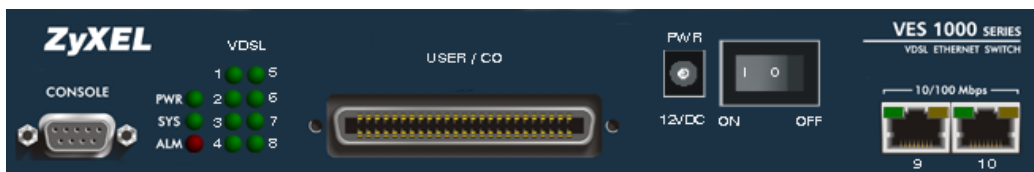
**If the SYS LED does not turn on then recheck your connections or refer to the *Hardware Troubleshooting* chapter.**

---

Make sure you can feel and/or hear the fans working (VES-1012 only) — working fans emit a low buzz and blow air. The fans are located on side panel that is to the left of the front panel. Refer to the *Hardware Troubleshooting* chapter to test the fans if they are not working.

### 5.2 Front Panel LEDs

The following figures show the front panels for both the VES-1008 and the VES-1012. LEDs show the operational status of your VES-1000 Series switch. Please also refer to the *Troubleshooting* chapter to see how the front panel LEDs may aid in troubleshooting.



**Figure 5-1 VES-1008 Front Panel**



**Figure 5-2 VES-1012 Front Panel**

**Table 5-1 VES-1000 Series Switches: LED Descriptions**

LED	COLOR	STATUS	DESCRIPTION
PWR	Green	ON OFF	The system is turned on. The system is off.
SYS	Green	Blinking ON OFF	The system is rebooting and performing self-diagnostic tests. The system is on and functioning properly. The power is off or the system is not ready/malfunctioning.
ALM	Red	ON OFF	There is a hardware failure in the system. The system is functioning normally.
VDSL	Green	Blinking ON OFF	The system is transmitting/receiving to/from the VDSL modem. The link to the VDSL modem is up. The link to the VDSL modem is down.
10 Mbps	Green	Blinking ON OFF	The system is transmitting/receiving to/from a 10 Mbps Ethernet network. The link to a 10 Mbps Ethernet network is up. The link to a 10 Mbps Ethernet network is down.
100 Mbps	Yellow	Blinking ON OFF	The system is transmitting/receiving to/from a 100 Mbps Ethernet network. The link to a 100 Mbps Ethernet network is up. The link to a 100 Mbps Ethernet network is down.

# Chapter 6

## Hardware Troubleshooting

*This chapter explains how to troubleshoot your VES-1000 Series switch. Refer also to the Troubleshooting chapter in the User's Guide .*

### System Startup

When you turn on the VES-1000 Series switch, it automatically runs a self-test that takes approximately 20 seconds. The **SYS** LED remains on if your VES-1000 Series switch has started normally.

#### 6.1.1 My PWR LED Does Not Turn On

**Table 6-1 PWR LED Troubleshooting**

STEP	CORRECTIVE ACTION
1	Make sure the power cord is connected properly to the power outlet. Make sure you are using the correct power source (For VES-1012, 35 watt max., 100-240 VAC/1A, 50/60Hz. For VES-1008, 24 watt max., 100-240 VAC/1A, 50/6-Hz).
2	Make sure the power cord is connected to the VES-1000 Series switch properly.
3	Make sure the fuse is not burnt-out. Replace the fuse if it is burnt out. (VES-1012 only)
4	The LED itself or the unit may be faulty; contact your vendor.

#### 6.1.2 My SYS LED Does Not Turn On

**Table 6-2 SYS LED Troubleshooting**

STEP	CORRECTIVE ACTION
1	Make sure the power cord is connected properly to the power outlet. Make sure you are using the correct power source.
2	Make sure the power cord is connected to the VES-1000 Series switch properly.
3	Make sure the fuse is not burnt-out. Replace the fuse if it is burnt out. (VES-1012 only)
4	The LED itself or the unit may be faulty; contact your vendor.

## The ALM LED Is On

The ALM (alarm) lights when the VES-1000 Series switch is overheated and/or the fans are not working properly (VES-1012 only) and/or voltage readings are outside the tolerance levels. The VES-1000 Series switch may become damaged if the ALM LED remains on.

**Table 6-3 ALM LED Troubleshooting**

STEP	CORRECTIVE ACTION
1	Go to SMT <b>Menu 24.12 - Hardware Monitor</b> to verify the cause of the alarm. See step 2 if the unit is overheated, step 3 if the problem is with the fans and step 4 if the voltages are out of the allowed ranges.
2	If the unit is overheated, turn it off and wait for it to cool down. Ensure the VES-1000 Series switch is installed in a well-ventilated area and that normal operation of the fans (VES-1012 only) is not inhibited. Keep the bottom, sides and rear clear of obstructions and away from the exhaust of other equipment. If the problem remains, take a screen shot of menu 24.12 and contact your vendor.
3	Make sure you can feel and/or hear the fans working (VES-1012 only) - working fans emit a low buzz and blow air.  If the fans are not working properly, make sure the power connector is connected properly. Make sure the fuse is not burnt-out. Replace the fuse if it is burnt out.  Contact your vendor if the fans do not work. Do not remove fans from the VES-1012. Only a qualified distributor should remove or repair fans.
4	If the voltage levels are outside the range, take a screen shot of menu 24.12 and contact your vendor.

## 6.2 A PORT LED Does Not Turn On

Port LEDs show connections to the VDSL modem. It should blink when the system is transmitting/receiving to/from the VDSL modem. If it is off, it means the link to the VDSL modem is down.

**Table 6-4 PORT LED Troubleshooting**

STEP	CORRECTIVE ACTION
1	Make sure the VES-1000 Series switch VDSL port is enabled (refer to the <i>User's Guide</i> ). The VDSL ports are disabled by default.
2	Check both the VDSL and phone line pin assignments shown in the <i>Appendix – Pin Assignments</i> to wire a Telco cable to a Telco-50 connector.
3	Check the phone wire connections between the VDSL modem and the MDF.
4	Check the phone wire connections between the MDF(s) and VES-1000 Series switch USER port.
5	Check the phone wire mapping on the MDF(s) – see <i>Chapter 3</i> .
6	Make sure the in-house wiring works and is connected properly (see <i>section 6.4</i> ).



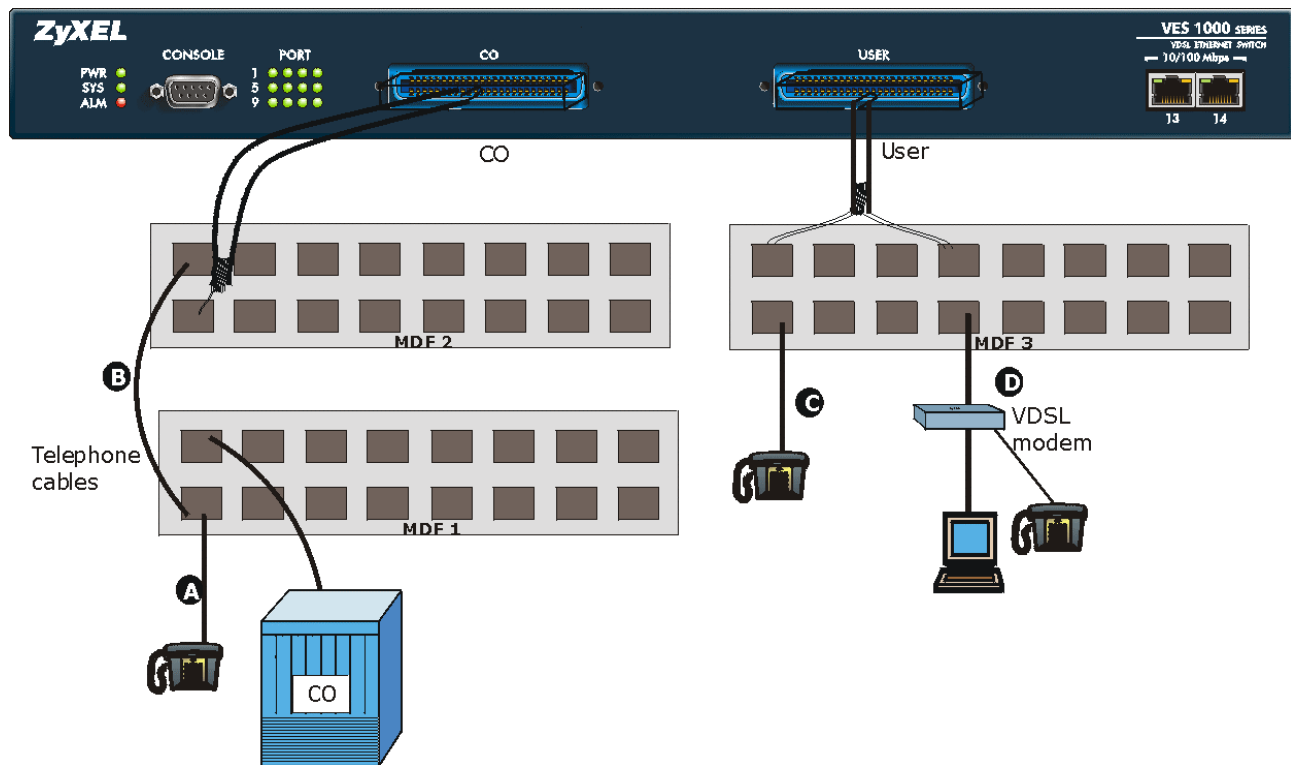
## 6.3 The WAN Link is down

STEP	CORRECTIVE ACTION
1	Check that the Ethernet ports (ports 9 and 10 on a VES-1008 and ports 13 and 14 on the VES-1012) connect to a WAN Ethernet using straight-through Category 5 UTP (Unshielded Twisted Pair) cables with RJ-45 connectors.
2	If you enable port trunking, make sure the WAN switch also supports port trunking. See your VES-1000 Series User's Guide for more details.
3	If you are daisy-chaining VES-1000 Series switches to the WAN switch, then make sure you are using crossover cables between VES-1000 Series switches and a straight-through cable between VES-1000 Series switch and an Ethernet switch.  You also need to change the default VLAN configuration – refer to the <i>VES-1000 Series User's Guide</i> .
4	The factory default settings for the Ethernet ports on the VES-1000 Series switch are: <ul style="list-style-type: none"> <li>➤ Speed: Auto</li> <li>➤ Duplex: Auto</li> <li>➤ Flow control: On</li> <li>➤ Trunking: Disabled</li> </ul> <p>If auto-negotiation is turned off on the VES-1000 Series switch, an Ethernet port uses the pre-configured speed and duplex mode when making a connection, thus requiring you to make sure that the settings of the WAN switch Ethernet port are the same to connect.</p>

## 6.4 Testing Wiring

Systematically test wiring using a functioning telephone to determine if there is a wiring problem. If the connection is good, the telephone will return a dial tone. Letters in the figure shown next indicate the systematic tests to be done. Suppose you're using installation scenario "B" as shown in section 3.4.2. The logic for other scenarios should be similar.

- A. Test A determines if there is a wiring problem between the CO and MDF 1.
- B. Test B determines if there is a wiring problem between the CO Telco port on the VES-1012 and MDF 2.
- C. Test C determines if there is a wiring problem between the USER Telco port on the VES-1012 and MDF 3.
- D. Test D determines if there is a building-wiring problem between the subscriber's wall jack and MDF 3.



**Figure 6-1 Testing In-house Wiring on a VES-1012**

Figure 6-1 applies to the VES-1012 only. The testing logic remains the same for the VES-1008 however the only exception is that the VES-1008 has a combined Telco-50 connector. The following test procedures can also be applied to the VES-1008; however, the tester will need to configure one separate cable to plug into the single Telco-50 connector is on the VES-1008 instead of two cables for the VES-1012.

**Table 6-5 Testing Wiring on a VES-1008**

STEP	TEST
A	Connect a standard telephone to MDF 1. If there is no dial tone, then a problem with the wire or wire connections between MDF 1 and the CO exists. Contact your telephone company for troubleshooting.
B	Remove the telephone cable(s) connecting MDF 1 and MDF 2. Connect a telephone to an upper port of MDF 2. If there is no dial tone, then the problem is between the combined Telco-50 port on the VES-1008 and MDF 2. Replace the Telco cable connecting the CO port to MDF 2.  If the problem remains, check the pin assignments of the Telco-50 connector.  If the problem remains, then the VES-1008 or MDF 2 is faulty. Repeat the test in step A using MDF 2 to determine if MDF 2 has problems. Contact the telephone company if that is the case.  If not, contact your VES-1008 vendor outlining the problem and the steps you took to solve it.
C	Connect a telephone to a lower port of MDF 3. If there is no dial tone, then the problem is between the combined Telco-50 port on the VES-1008 and MDF 3. Replace the Telco-50 cable connecting the VES-1008 to MDF 3.  If the problem remains, check the pin assignments of the Telco-50 connector.

**Table 6-5 Testing Wiring on a VES-1008**

STEP	TEST
	<p>If the problem remains, then the VES-1008 or MDF 3 is faulty. Repeat the test in step A using MDF 3 to determine if MDF 3 has problems. Contact the telephone company if that is the case.</p> <p>If not, contact your VES-1008 vendor outlining the problem and the steps you took to solve it.</p>
D	<p>Disconnect the VDSL modem from the wall jack and connect the telephone to the wall jack. If there is no dial tone, then there is a problem with the building wiring between the VDSL subscriber's home and the MDF. Contact your telephone company for troubleshooting.</p>

**Table 6-6 Testing Wiring on a VES-1012**

STEP	TEST
A	<p>Connect a standard telephone to MDF 1. If there is no dial tone, then a problem with the wire or wire connections between MDF 1 and the CO exists. Contact your telephone company for troubleshooting.</p>
B	<p>Remove the telephone cable(s) connecting MDF 1 and MDF 2. Connect a telephone to an upper port of MDF 2. If there is no dial tone, then the problem is between the VES-1012 Telco CO port and MDF 2. Replace the Telco cable connecting the CO port to MDF 2.</p> <p>If the problem remains, check the pin assignments of the CO Telco connector.</p> <p>If the problem remains, then the VES-1012 or MDF 2 is faulty. Repeat the test in step A using MDF 2 to determine if MDF 2 has problems. Contact the telephone company if that is the case.</p> <p>If not, contact your VES-1012 vendor outlining the problem and the steps you took to solve it.</p>
C	<p>Connect a telephone to a lower port of MDF 3. If there is no dial tone, then the problem is between the VES-1012 Telco USER port and MDF 3. Replace the Telco cable connecting the USER port to MDF 3.</p> <p>If the problem remains, check the pin assignments of the USER Telco connector.</p> <p>If the problem remains, then the VES-1012 or MDF 3 is faulty. Repeat the test in step A using MDF 3 to determine if MDF 3 has problems. Contact the telephone company if that is the case.</p> <p>If not, contact your VES-1012 vendor outlining the problem and the steps you took to solve it.</p>
D	<p>Disconnect the VDSL modem from the wall jack and connect the telephone to the wall jack. If there is no dial tone, then there is a problem with the building wiring between the VDSL subscriber's home and the MDF. Contact your telephone company for troubleshooting.</p>



# Appendix A

## Removing and Installing a Fuse

*This appendix shows you how to remove and install fuses for the VES-1012.*

This section applies to the VES-1012 only.

The VES-1012 uses one 250V-3A fuse. The VES-1012 comes with two 250V-3A fuses; one is installed at the factory (in the fuse housing), while the other one is a spare that comes with your VES-1012. If you need to install new fuses, follow the procedure below.

### Before you begin, you will need:

- A small flat head screwdriver
- 250V 3A fuse(s)
- Good lighting

### Removing and Installing Fuses

#### Removing Fuses

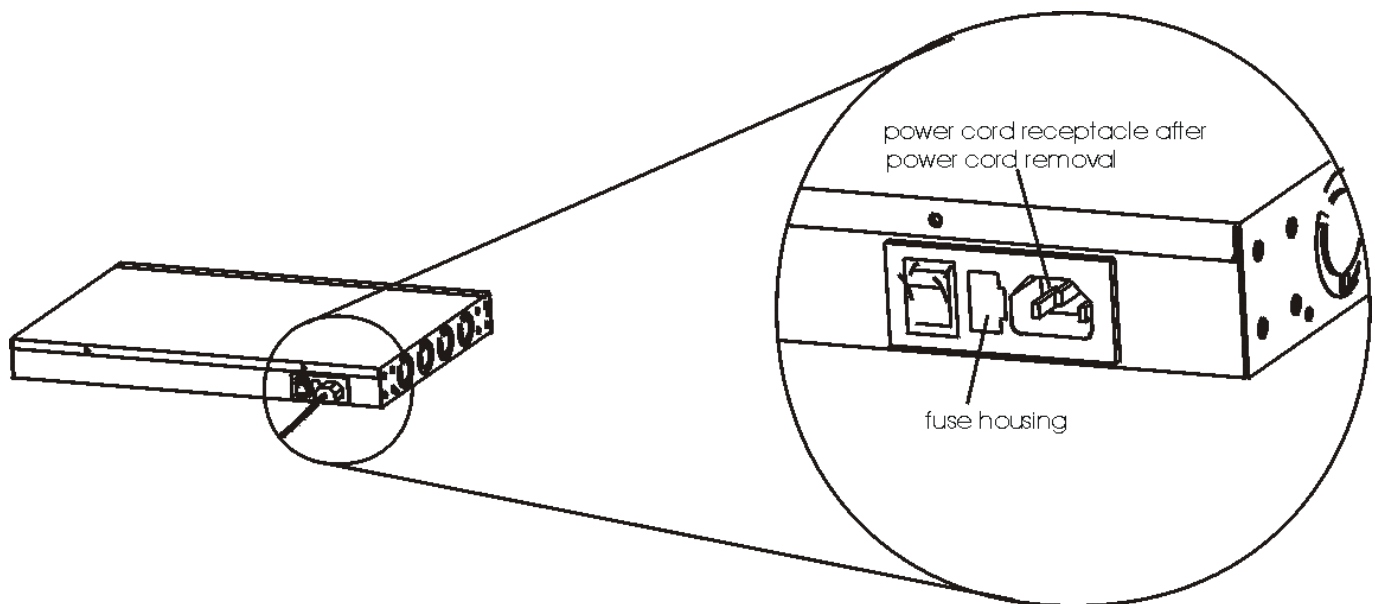
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**Safety first! Disconnect all power from the VES-1012 before you begin this procedure.**

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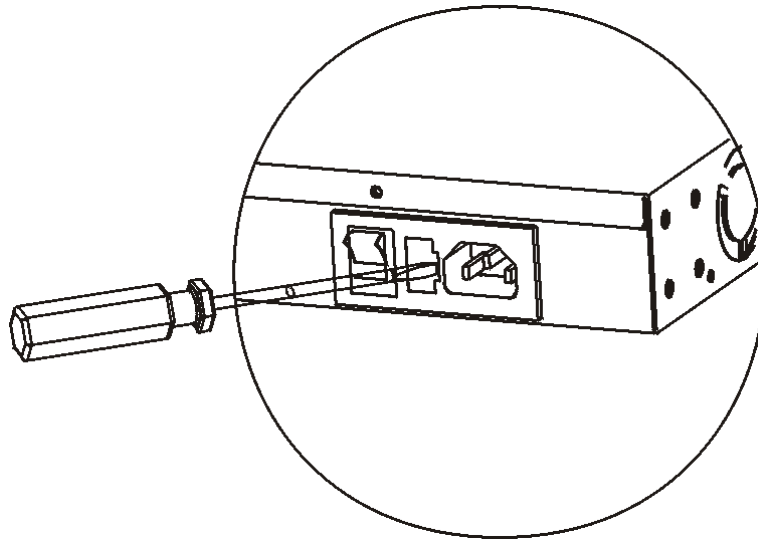
**Step 1.** Place the rear panel of the VES-1012 in front of you.

**Step 2.** Remove the power cord from the back of the unit for easy access to the fuse housing as shown next.



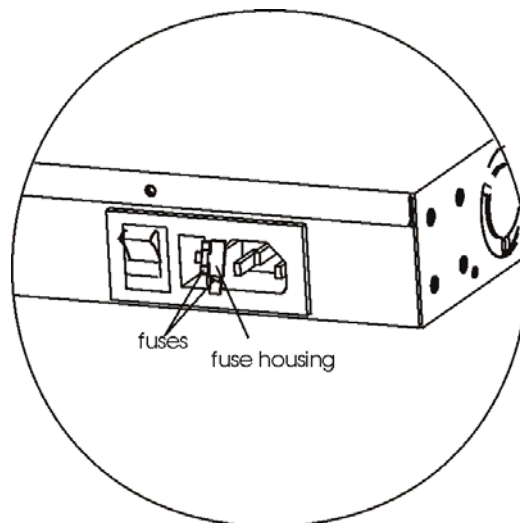
**Diagram 1 Removing the Power Cord**

**Step 3.** Using a small flat head screwdriver, gently open the left side of the fuse housing located to the left of the power receptacle as shown next.



**Diagram 2 Opening the Fuse Housing**

**Step 4.** Gently pull out the casing that holds the two fuses as shown next.



**Diagram 3 Fuses in the Fuse Housing**

**Step 5.** Pull gently, but firmly, to remove the burnt out fuse from the fuse housing. A burnt-out fuse is blackened, darkened or cloudy inside its glass casing. A working fuse has a completely clear glass casing. Dispose of the burnt-out fuse(s).

### **Installing Fuses**

**Step 1.** Push the replacement fuse into the fuse housing until you hear a click.

**Step 2.** Firmly, but gently, push the fuse housing back into the VES-1012 housing until you hear a click.

**Step 3.** Plug the power cord back into the unit.

# Appendix B

## Pin Assignments

### Console Port Pin Assignments

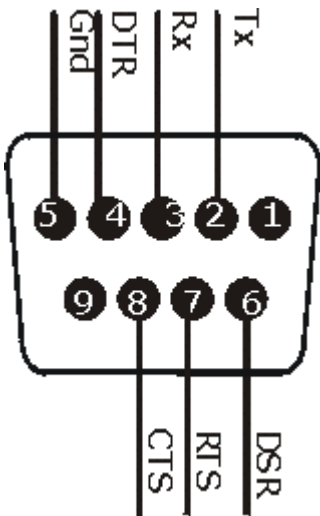


Diagram 4 Console Port Assignments

### VES-1008 Telco-50 Pin Assignments for Phone and VDSL

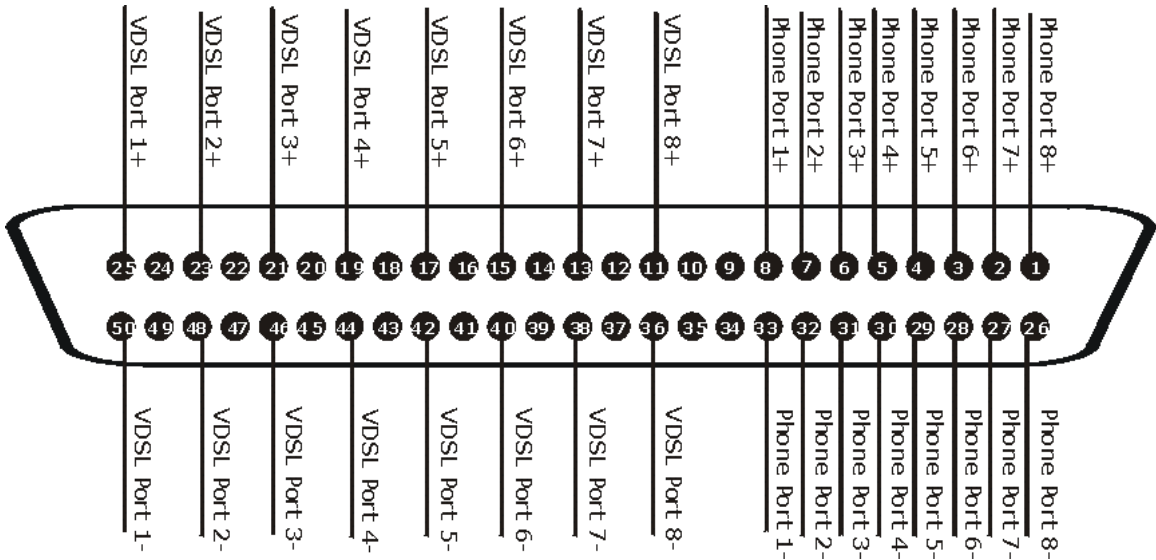
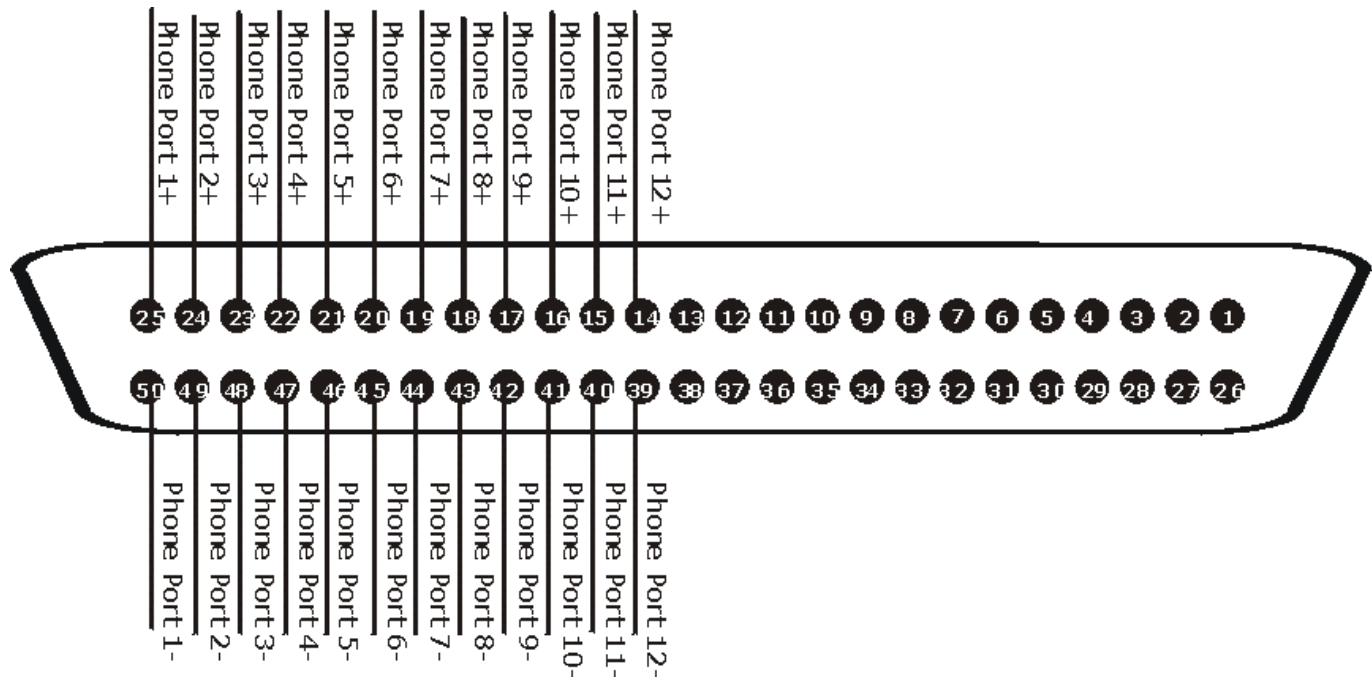


Diagram 5 Wiring Diagram for the VES-1008 Telco-50 connector

**Table 6-7 Pin Assignments for VES-1008 Telco-50 port**

PHONE PORT	TELCO-50 PIN ASSIGNMENTS
1	8, 33
2	7, 32
3	6, 31
4	5, 30
5	4, 29
6	3, 28
7	2, 27
8	1, 26
VDSL PORT PINS	TELCO-50 PIN ASSIGNMENTS
1	25, 50
2	23, 48
3	21, 46
4	19, 44
5	17, 42
6	15, 40
7	13, 38
8	11, 36

**VES-1012 Telco-50 Pin Assignments for Phone Lines****Diagram 6 VES-1012 Telco-50 Pin Assignments for Phone Lines**



### VES-1012 Telco-50 Pin Assignments for VDSL Connections

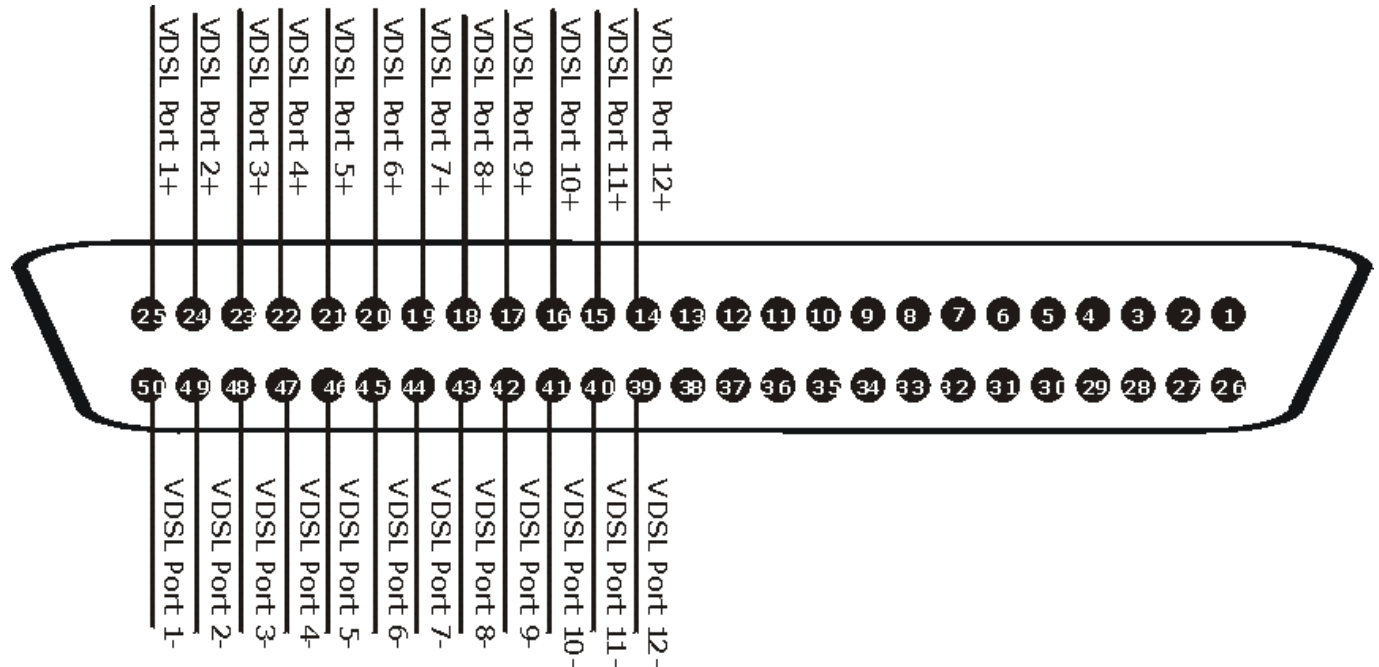


Diagram 7 VES-1012 Telco-50 Pin Assignments for VDSL Connections

#### RJ-45 Pins

PIN #	RJ-45 (ETHERNET PORT)
1	TX
2	TX
3	RX
4	Not connected
5	Not connected
6	RX
7	Not connected
8	Not connected

#### RJ-11 Pins

PIN #	RJ-11 (TELEPHONE PORT)
1	Not connected
2	RING
3	TIP
4	Not connected



# Appendix C

## Hardware Specifications

### VES-1008 Specifications

#### Physical Interfaces

- Compact A4-sized enclosure
- 10" 1U rack/wall mountable unit
- One Telco-50 connector for 8 ports to CPE and POTS/ISDN to MDF or CO
- One Console port for local management
- Two RJ-45 auto-negotiating 10/100M Fast Ethernet interfaces for uplink to any third-party Ethernet switch or router
- Temperature, voltage monitoring and alarm
- Auto-shutdown for over temperature
- Surge protection to prevent lightning damage

#### Dimensions

- 248.2 mm (W) x 285 mm (D) x 44.5 mm (H)

#### Weight

- 2.9kg

#### Power Supply

- Power Consumption: 24W
- Input: 100-240VAC/50-60Hz / 0.8A
- Output: 12VDC/2.0A
- Safety standards: UL, CUL, TUV, CE, PSE

#### Operating Environment

- Temperature: 0 — 50°C; Humidity: 5% — 95%

#### Storage Environment

- Temperature: -25 — 70°C; Humidity: 5% — 95%

## **VES-1012 Specifications**

### **Physical Interfaces**

- 19" 1U rack-mountable, wall-mountable unit
- Two Telco-50 connectors, including
  - o 1 Telco-50: 12 USER lines (to the VDSL subscriber)
  - o 1 Telco-50: 12 CO lines (to the central office or PBX)
- One DB-9F RS-232 local console port
- Two RJ-45 auto-negotiating 10/100M Fast Ethernet ports for uplink connection
- Built-in fans
- Temperature, fan speed and voltage sensors for monitoring
- Surge protection to prevent lightening damage

### **Dimensions**

- 440mm (W) x 290mm (L) x 43mm (H)

### **Weight**

- 4.4 kg

### **Power Consumption**

- 35 watts maximum
- 100-240VAC/1A, 50/60Hz

### **Fuse Rated**

- T3A250VAC

### **Operating Environment**

- Temperature: 0°C — 50°C
- Humidity: 5% — 95%

### **Storage Environment**

- Temperature: -25°C — 70°C
- Humidity: 5% — 95%

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